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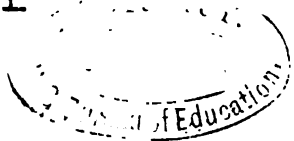
DEVOTED TO

The Dissemination of Normal Principles and to Practical School Work.

EDITORS:

J. E. SHERRILL AND R. HEBER HOLBROOK.

VOLUME III



DANVILLE, INDIANA :

NORMAL PUBLISHING HOUSE, J. E. SHERRILL, PROPRIETOR.

1880.

Harvard University



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VOL. III. DANVILLE, IND., MARCH, 1880. No. 1.

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ELIAS SCHNEIDER.

34277
In the preceding ~~four~~ articles the figure and volume of the earth were the subjects of consideration. I propose now to speak of the motions of the earth. The motion, most appropriately considered first, is, I think, that which the earth has in common with the sun. The question is sometimes asked, does the sun move through space? Let it be known, at the very outset, that everything in God's creation is in motion. No particle of matter, whether large or small, is or can be in a state of absolute rest. The truth of Newton's law of gravitation is a sufficient proof of this. If every particle of matter, large or small, in the entire expanse of space, is attracted by every other body of matter, then everything in space is in motion.

This is true, not only in theory, but also in fact. It has been ascertained by careful observations, made by eminent Astronomers at widely different parts of the earth, and by a long series of such observations, that the sun is in motion through space, carrying with it, as it sweeps along, all its planets, satellites, and comets. And very close and careful calculations, based upon these observations have been made, showing also in what direction and with what velocity the whole solar system is moving.

Although the sun is nearly three hundred and twenty-six thousand times as heavy as the earth, it nevertheless sweeps through space, carrying with it the whole solar system, with a velocity of nearly 100,000 miles every day, and nearly four thousand two hundred miles every hour. Yet so immense is the orbit in which the solar system travels, that about four millions of years are required to complete one revolution. When that revolution has been completed, then will the great clock of our solar system have struck—shall I say one, two, or twelve? We can not tell, for the whole history of man is a mere point in time.

Although this orbit is so immense, yet, if its path were marked by a train of golden light in the heavens, it would appear, if seen from the nearest fixed star, probably no larger, at such an immense distance, than the circle of the sun.

Our system, astronomers tell us, is moving at present towards the star π in the constellation Hercules. Draw an imaginary line from the pole star through the small bear or small dipper, as it is some times called, extending about 45 degrees, and you get near the point. The centre of motion is supposed to be near the star Alcyone in the Pleides.

The question now arises, in every inquisitive mind, when and how did the earth acquire this motion through space, in company with the sun? We know that the earth keeps continually at an average distance of about 93,000,000 of miles from the sun. If the sun moves through space, and the earth did not move in the same direction and with the same velocity as does the sun, then these two bodies would soon cease keeping company with each other, and the earth would become a cold globe of ice. But what law keeps them from parting company? The law of gravity can not account for this. If some external force were applied to the earth, sufficient to double its velocity, the law of gravity would not prevent the earth from revolving around the sun at a greater distance; and if the sun alone were to receive an external impulse, sufficient to double its velocity through space, the earth could not follow it. If then the law of grav-

ity can not account for the fact that the earth moves through space, in company with the sun, how *can* we account for this?

Suppose the earth were, by some power, sufficient for the purpose, united unto the sun; and that the sun's velocity through space were then doubled. The earth's velocity, through space, would then also be doubled, and this acquired velocity would not be lost by the earth, if transferred again to its former distance from the sun, or suppose a portion of the sun, as large in mass as the earth, were propelled 93,000,000 of miles from the sun, and made by some power, to revolve around it in one year, that mass would not lose its velocity through space, but would continue to move forward just as much so as though still a part of the sun itself. A body, once set in motion by any power, will never lose that motion, unless resisted by another and equal force in the opposite direction. I must therefore come to the conclusion, that the earth was at one time a part of the sun.

TALKS ABOUT ELOCUTION.—NO. III.

G. WALTER DALE.

Elocution is a branch that should be taught as a specialty. It is an art well worthy the whole time of any teacher. I think we shall see the time when more of our teaching in graded schools will be done by specialists. There is probably no study requiring a more complicated mental action than reading aloud so as to impart all the emotional accessories of the sense. No other study tends more rapidly toward developing and refining the sensibilities than this; one special division of this work now appeals to me as a topic for this "Talk;" I speak of Mental Picturing.

By this process we are enabled to conceive definite ideals and sharply defined images of the word scenes we are depicting. This makes our description vivid or our narration vivacious and wide awake. It moves to tears in pathos or

to laughter in comedy. It makes the flesh creep and thrill in tragedy and lack of it enables us to sit unmoved through the recitation of the most affecting language—that is language having all the requisites for strong emotional feeling.

In order to have children master this difficult department of the art cause them to picture everything fully by questioning them to draw their conceptions out in logical order.

Monroe in his work on Vocal and Physical training gives the method in such an excellent manner that it seems almost ridiculous for me to attempt it after him. I choose rather to cite an example:

"I stood on the bridge at midnight
As the clocks were striking the hour,
And the moon rose o'er the city
Behind the dark church tower."

Take the picture presented here and ascertain how definite the pupil's idea by careful questioning, as: What kind of a bridge is it? Let the pupil answer without prompting so as to secure an exact idea of his bridge.

What season of the year do you enact this scene? Are there any trees in view? What time of the year do you make it? Is it very dark? Is the moon large when it rises at or near midnight? What clocks do you hear? What hour do they strike? Describe the appearance of the city in the moonlight. Are you in the light or shadow? If in shadow what casts it? Why do you say "the dark church tower?" What is the effect of the whole scene upon you? Thus by questions graded according to the sense and difficulty of the work you can interest any class and draw out the most artistic pictures, adding wonderfully to the vividness of their reading.

The artist passes through much the same process of mental picturing in the composition of his works and according to his skill in grouping and in transferring from mental to canvass tablets depends the commercial value of his work.

Try to keep your pupils from composing a mental picture for a model in Elocution that shall conform to the stereo-

typed idea peddled about by uncultured pretenders and imposed upon the unwary as high art which is in reality the veriest slush of deception. Teach them that Nature must be our guide in such work and that the nature must always be the nature of the case.

SOME POINTS FOR A MORNING LECTURE.

G. DALLAS LIND.

I do not believe very much in the lecture system of instruction as a system, but good, brief, pointed lectures occasionally for a variety, are instructive and entertaining and can be made a valuable means of securing punctual and prompt attendance at school. Lectures not to exceed five minutes in length may be given in district schools with profit both to the teacher and pupils. The teacher will by practice gain power to speak and think before an audience and the pupils will be pleased and instructed, provided the lectures are made plain and simple enough to be comprehended and given in a free and easy conversational style, and on such subjects as are of themselves calculated to interest inquiring minds. With primary pupils lectures upon subjects of natural science illustrated by natural objects or experiments accompanied with questions and oral drill, will be very well received. Older pupils may be interested in more abstract subjects.

I propose to make this the first of a series of brief articles each one containing a partial, and it is hoped, suggestive outline of a lecture adapted to certain grades of pupils.

I will here give a synopsis of a five minute morning lecture, or talk, or drill, or whatever you choose to call it, on *The Oak Tree*:

1¹. *Definition of a Tree.* It will be necessary to define a plant first. Draw out of the pupils, if possible, the idea by appropriate questions, then frame a concise definition.

2¹. *Kinds of Trees.* Let pupils mention as many kinds

as they can think of. Compare the oak tree with other trees in size, appearance and usefulness.

3¹. *Parts.*

1². Taken vertically.

1³. Root. 2³. Trunk. 3³. Branches.

2². Taken transversely.

1³. Bark. 2³. Wood. 3³. Pith.

4¹. *Organs.*

1². Leaves.

1³. Forms. 2³. Uses.

2². Flowers.

1³. Forms. 2³. Uses.

Under *Parts*, you may say something about the structure of exogenous plants and by familiar illustrations show that there are two grand divisions of the flowering plants and that the oak is a representative of one of them. Under *Organs*, you may speak of the great variety of the forms of leaves and their uses; of the peculiarities of the blossoms and their use in producing the fruit, also of the fruit, its forms, uses, &c.

If you study this subject with the object in view of enlightening inquiring young minds on some of the fundamental truths of Botany, you will find it of immense value to you and your pupils. If they have never studied Botany your language must be very plain and simple in every part. Perhaps you will not be able to say one-tenth part of what you want to say in the five minutes talk, but you should stop promptly at the expiration of the time and defer the remainder until another lecture. This outline may be gone over in five minutes and one may talk an hour upon it. There are many other subjects which are more interesting and instructive than this one, but remember that more depends upon the teacher than upon the subject. Cultivate your powers of expression and explanation and watch the effect upon your auditors. If you see that you are not holding their attention, stop at once. There is nothing better calculated to teach stupidity than being compelled to listen to what does not interest one. Here is where one of the abuses of the lecture system comes in.

ELECTRIC EXPERIMENTS.

J. E. BAKER.

Electrified Water. Place a tin pan or a deep plate, nearly full of water, on a few sticks of sealing-wax. Take two or three feet of copper wire and fasten one end to the copper ring of Cottrell's Rubber (described in Jan. number of THE NORMAL TEACHER) and allow the other end of the wire to rest in the water. Now rub the tube after which bring the finger near the surface of the water and a spark will be observed. Place a small cork on the water, rub the tube as before and bring finger near the cork which will instantly approach the finger. Cut from a postal card a piece about the size of a 25-cent piece and pass through the center a pin. Now place this upon the water so that it will float with the pin pointing upwards. Again rub the tube and bring the finger near the pin which will dart towards the finger as though possessed of life. Rub again and bring an icicle or piece of ice near the water, again a spark will be seen. If a light toy is made of cork or pith and allowed to float on the water, the experiment may be rendered very interesting. This experiment is easily manipulated if Cottrell's Rubber is in good working order and the atmosphere is dry.

Electric Attraction. Place some sewing machine oil on a watch glass (or any piece of glass). Rub a glass tube with a silk handkerchief and pass the excited tube over the oil. A tidal wave of oil will move in the direction of the tube. Bring the tube nearer and drops of oil will leap quite a distance to the tube. The glass should be upon a small stand or block, and not upon a large flat surface.

Electric Repulsion. Take a wire about the size of a knitting needle, and a foot long. Bend it in a semi-circular shape. Heat one end and sink in a stick of sealing-wax at the end. Heat the other end of the wax and stick it to a board or the top of the table so that the end having the wire will point upward and the free end of the wire downward. From tis-

sue paper cut about a dozen strips about four inches long, fasten all together at one end. Attach this end to the free end of the wire with a thread so that the free ends of the tassel hang downward. Now rub the tube with the silk handkerchief and bring the tube along the wire near the tassel, the strips become charged and diverge, repulsion is the result. The wire supporting the tassel may be connected with the ring of Cottrell's Rubber by a small wire; working the tube the strips of paper forming the tassel will diverge as before.

These experiments prove very interesting to pupils and are excellent aids in transforming a school-room, that seems to be a prison to children, to a delightful and attractive hall of science and learning. It is a panacea for indolent pupils. It was urged at the recent meeting of the N. W. O. Teachers' Association, at Sidney, O., that our common school pupils could not comprehend such subjects as centrifugal force, gravitation, &c., that those subjects puzzled mature minds, and that the show and rattle of apparatus were all that would be gained. With the same propriety we could oppose Mathematics on the ground that pupils could not understand the extraction of sixth root, tangent, co-sine, &c. It must be remembered that it is the elementary principles that are taught in our common schools.

You may glean knowledge by reading, but you must separate the chaff from the wheat by thinking.

BE noble! and the nobleness that lies in other men, sleeping, but never dead, will rise in majesty to meet thine own.
—*Lowell.*

TEACHERS, do you give your classes frequent reviews? The leading points in each lesson should be reviewed the next day and general reviews should be given weekly and monthly, bringing out and combining all points passed over.

CORRESPONDENCE.

VERTICAL LINE CANCELLATION.

Editor Normal Teacher:—I received a number of your journal, and in looking it over noticed that the subject of vertical line cancellation in Arithmetic is apparently not understood by Hoosier teachers.

For instance in your December number, page 331 is given a needlessly long solution of the following example:

"If 12 oz. of wool make $2\frac{1}{2}$ yds. of cloth $1\frac{1}{2}$ yd. wide, how many lbs. of wool will it take to make 150 yds. of cloth $\frac{3}{8}$ yd. wide?"

As it is an example in proportion, we will bring out the *cause* and *effect*, and then use vertical line cancellation.

$$\begin{array}{l|l} \text{C. X lbs.} & \left. \begin{array}{l} 150 \text{ long.} \\ \frac{3}{8} \text{ wide.} \end{array} \right\} \text{E.} \\ \text{E. } \left\{ \begin{array}{l} 2\frac{1}{2} \text{ long.} \\ 1\frac{1}{2} \text{ wide.} \end{array} \right. & \frac{11}{8} \text{ lbs. C.} \end{array}$$

Now the above is the statement and may be explained thus:

If $2\frac{1}{2}$ long and $1\frac{1}{2}$ wide is the *effect* of $\frac{11}{8}$ lbs., what is 150 long and $\frac{3}{8}$ wide the *effect* of?

Having stated it on the vertical line I reset the numbers below for the purpose of cancellation as follows:

$$\begin{array}{r|l} & 150 \\ 8 & 5 \\ 16 & 12 \\ 5 & 2 \\ 3 & 2 \\ \hline & 18\frac{3}{4} \text{ Ans.} \end{array}$$

The work of cancelling across the line is simple and every teacher *should* be familiar with it. Thus, 2 times 2 are 4 on the right in 16 on the left 4 times. Then 4 on the left in 12 on the right 3 times. Then 3 on the right against 3 on the left, and 5 on the right against 5 on the left. Now only 8 on left and 150 on right are uncanceled. Dividing both by 2 and we have on the right 75 and 4 on the left—or the improper fraction $\frac{75}{4}=18\frac{3}{4}$ ans.

How the writer in the *Indiana School Journal* could get 25 for the answer and the writer in your journal could, in the September number, get 18 is to me a matter of surprise. And further, what need of the long analysis given in your December number which, by the way, is correct and of course leads to the true answer?

I regard the text-books on Arithmetic with indifference. Many teachers are far in advance of them. For one I use vertical line cancellation and the principle of *cause* and *effect* in all examples in Interest, Partial Payments, Proportion, &c.

I will furnish you with two or three articles by way of illustration soon. Your journal really seems to be a superior one.

I will add a word in regard to the schools of California. We had a model system of education here, but the late State Convention destroyed it when they formed a new Constitution and we are all at sea. Chaos has come again, and we are set back a quarter of a century. This State is flooded with teachers. The Trustees of a school near me lately advertised for a male and female teacher and had over 100 applications.

Moral.—Don't come to California to teach school.

Loyalton, Sierra Co., Cal.

T. H. ROSE.

GRAMMAR IN PUBLIC SCHOOLS.

Editor Normal Teacher:—In the January number of THE NORMAL TEACHER, Mr. Gillilan advocates the teaching of Grammar to very young children, claiming that this study is not only easy, but natural. I do not agree with him. The science of Grammar is a very difficult one. It requires reasoning power to comprehend this study as it deals almost altogether with abstractions. The natural process of education is from the concrete to the abstract. *Language* should of course be taught early. A child should be led to acquire correct habits of expression from the very start. A child learns to speak just exactly the language he hears spoken. Now, if he have a correct model given him, he will of course learn to speak correctly, and then as this is all that Grammar professes to teach, why should he study Grammar at all? I see no reason why he should. *Language* depends altogether upon habit. Even though a person be a good grammarian (by this term I mean one possessed of grammatical *knowledge*) it is difficult for him to speak correctly, if he have previously acquired the *habit* of speaking incorrectly.

The proper course then is to teach language. Let the pupil learn to speak correctly—let him be taught the meaning of words, and to read understandingly. He should be taught in connection with reading, the uses of capitals, punctuation marks, &c. A child taught in this way would be able to speak correctly, and to express his thoughts correctly in writing. Many children who have studied Grammar, leave school without the power of understanding what they may read in a newspaper. If the time spent in trying to force this abstract study into their heads should be spent in teaching them to read understandingly, they would profit far more by it. The province of the Public School, it appears to me is to do as much as possible for the child in the few years that he attends school. It certainly is not advisable to begin any study which will not be completed and will be dropped as soon as the pupil leaves school. The study of Grammar is seldom thoroughly understood by pupils before they leave school, and is forgotten as speedily as possible afterwards.

If the study of Grammar were entirely omitted, and the time thus saved spent in teaching the *language*, the schools would be greatly benefited. The fact is that the study of Grammar does not teach the language.

South Covington, Ky.

CHAS. W. WAITE.

A. CRITICISM.

Editor Normal Teacher:—I notice in the January number of THE NORMAL TEACHER that T. A. Pugh in analyzing the sentence "He made the water wine," disposes of "the water" as the direct object, and "wine" the attributive object, both together forming a double object, used to complete the meaning of "made."

This I can not see as clearly as I presume the learned gentleman would have his readers see his analysis.

I can not see how Mr. Pugh can view the phrase, "the water," as the direct object of "made." It seems more clear that the wine was made, and that the water was used in making it.

The view I take of this is that the phrase "the water wine," not the water only, is the direct object of "made." I understand that this phrase is what we choose to call a *clausal* phrase; i. e., it is a phrase formed from a clause by dropping out the asserting element, and expressing the relational element, if expressed at all, in an infinitive or a participle.

Expressing the relational element, the sentence reads "He made the water to be wine." I say the phrase, "the water to be wine" is a clausal phrase, used as the direct object of the predicate made. "The water" is the subject part of the phrase, "wine" the predicate part, and "to be" the relational element.

Terre Haute, Ind.

J. L. WARMAN.

EDITORIAL NOTES.

THE CHRISTIAN UNION in a late issue speaking of the rotary system of State and Church makes the following timely hints in regard to the school: "Our common schools are mere stations at which men stop on their journey twenty minutes for refreshments. The compensation is made so small by our false economy that men of brains and energy can not afford to take up with teaching as a profession. Who would trust his property to a lawyer who had taken up with practice for a year or two till he had got enough money to begin to study for a mercantile pursuit? Who would put himself or his family under the care of a physician who was practicing medicine merely to get a little pocket money, and who intended in a couple of years to go into some other calling? We would not put a horse into the hands of such a horse doctor; but our children we put where we should not put a beast nor a dollar—in the hands of raw men that have no intention of becoming teachers and no enthusiasm for their profession; men who are merely teaching as a makeshift, in order to raise a little money to get married, or to finish their education in the seminary or the law or the med-

ical school. Rotation in office is the same evil thing in school, Church and State; in all three we need nothing so much as the principle established that if a man is doing his work faithfully and well he is to remain in his post, * * * and that when he ceases to do well he is to leave."

This is certainly a consummation devoutly to be wished, but how to reach it is the problem. So long as teachers are as poorly paid as at present no such thing as a continuous tenure can be even hoped for. The remedy which we have always advocated is better wages and higher qualifications. We believe that the people will be willing to pay teachers a salary commensurate with the services rendered if they can be made to see that it is to their best interests and that it is real economy to do so. The public must be educated. The teachers are the educators here as well as in the school-room. If you do not do it rest assured that it will never be done. Various means are at hand for the accomplishment of the work. One of the most effective agencies is the printed page. Discuss this matter through the columns of the local paper. Make your communications short and to the point. Editors will then be glad to publish them and the people will be sure to read them. Organize associations for the purpose of carrying out your plans. Invite the people out to your meetings to hear your discussions and resolutions. Talk publicly and privately about the low wages paid, and the great responsibilities and requirements of the teacher. Make it plain that you must keep up with the times in your work and to do this you must read and study and attend and visit schools. That if you do not do these things you can not meet the demands made upon you. That your profession gives you employment for only half the year and that if you follow some other business the other half that you soon grow "rusty" and become unfit for your work. That your wages must be sufficient to enable you to fit yourselves to do good and effective work. Present every phase of the matter in the clearest light possible. Agitate! Agitate!! It is a shame that many of our best teachers in the country schools are paid such an insignificant sum that after teaching five months, they have scarcely money enough left, after paying their board, to buy them a suit of clothes. This is not an overdrawn picture but is actually the case in many localities. How can a teacher who is paid such a meager sum attend school, buy books, and subscribe for educational journals? The hard times of late years have had much to do in cutting down teachers' wages. Now that prosperity is again returning to every branch of industry—that iron, and wheat, and corn and almost every commodity and wages in general have advanced in price in some cases to an enormous extent, in the name of justice and for the best interests of all classes we urge that teachers' wages be advanced and that the standard of qualifications be raised so that those who are unfit for the school-room will be kept out, and that those who are employed will be workmen worthy of their hire.

Now, that the schools are beginning to close many teachers are asking themselves the question, Shall I have any special closing exercises, and if so, of what shall they consist? Right here let us say that the teacher who

has been able to keep up an unflagging interest in his school until the close without resorting to any special measures outside of the legitimate work of the school-room has achieved an object worthy of praise. In answer to the first question we would say, yes. The second is not so easily answered. Such exercises generally consist of an examination or exhibition. Either or both of these are good if properly conducted. The former is often conducted in an unfair manner, taking pupils off their guard and rendering embarrassment very great. It is often the case that at these examinations some egotistical "philosopher(?)" of the neighborhood is appointed by some one or takes it upon himself to examine the scholars "to see if they know anything or have a teacher that is any account." No teacher should allow any such examination. If the teacher desires an examination he should conduct it himself. Let us suppose that a teacher desires to examine a class in Arithmetic. Let him step to the board and place an example upon it, then call upon some member of the class to rise at his seat and give the first step in the process, another the second step, another the third step and so on through. In grammar, let some visitor select a page, then the teacher will say "Mary please rise and give the part of speech, construction and rule," for some word which he has selected. It is only necessary that the part of speech, construction and rule be given. In this way an examination may be made profitable and interesting to both pupils and visitors. The great objection urged against exhibitions is that too much time is required, and that at the best part of the term, to prepare for them. This need not, and certainly should not be the case. Better by far that no exhibition should be thought of than that the last four or five weeks of the term should be consumed in preparations for a great demonstration. But we see no reason why this need be the case. We have witnessed many school exhibitions that did great credit to both pupils and teacher that did not consume one hour of the school time and that greatly added to the interest and work of the school instead of interfering with it. This objection can be made so puerile by the teacher who knows how to conduct these entertainments, that it will simmer down from an objection to one of the most delightful incentives to regular school work. The way in which exhibitions are carried on at present by most country teachers vastly more is lost than gained. So are some schools worse than no schools. But shall we abandon the idea of schools because some are worthless? We answer, no. By all means close your school with an exhibition, but do not let it detract from the regular interest and work of the school. Charge an admission fee of five or ten cents if you feel so disposed and invest the proceeds in a dictionary, globe, outline maps or something needed in the school, and thus leave a lasting monument of your work to the teachers who may follow you. The last exercise which we have to propose is an exposition. This is by far the most profitable and interesting entertainment that the school could possibly offer. It is simply an exposition of the work done during the term by the pupils. As the exposition merits considerable attention as a closing exercise, we will reserve what thoughts we may have to offer upon it for a future note.

MISCELLANEOUS DEPARTMENT.

HINTS AND HELPS FOR THE SCHOOL-ROOM.

It is not often best to ask leading or suggestive questions except to very young pupils. A drawing out process of this kind is, however, far better than mere lectures, because the attention of the class is held, and this is a point of great value. On this point read the following extract from Thomas Morrison, an eminent Scottish educator:

"Direct questioning, whether conducted individually or simultaneously, forms an admirable method of taking stock of the pupil's acquirements, but it is not equally well adapted to lead the pupil on to new regions of thought, and new fields of observation. For it will be observed, that in oral instruction the teacher assumes that the child is ignorant of the facts which he is about to state, and of the conclusion which he intends to deduce from these facts. No doubt, a question may be of such a suggestive nature, as to lead the pupil to divine almost intuitively the answer, and may in this way become the means of leading him on from one point to another, until an entirely new subject has been brought before him. But in general, it will be found that such suggestions can be far more effectively given by introducing to the pupil's notice a certain portion of the statement, and, when he has thus obtained the requisite hint, by allowing him to complete the idea. This prevents the lesson from degenerating into a mere lecture, which, as an educational power, is utterly valueless where children are concerned. The teacher is introducing his pupils into a new untried field. He will do them little good if he walk rapidly through, discoursing eloquently it may be, on its wonders and beauties; but he may arouse their attention, secure their interest, and thus set them a thinking, if he moves slowly forward, giving a hint here, and a hint there, but allowing the pupils to discover for themselves the objects of interest which lie in their path."

The following extract from the writings of that great pioneer of education, the great father of Normalites, though written long ago and for a different class of people from ours contains valuable suggestions, and pictures, alas, too many schools, and school-masters of to-day:

"If the children must be sent to school, the school-master should be an open hearted, affectionate, and kind man, who would be like a father to the children; a man made to open childrens' hearts and mouths, and draw forth their ideas. In most schools, however, it is just the contrary. The master seems to shut their hearts and mouths, and bury their common sense. This is the reason why healthy and cheerful children, whose hearts are full of joy and gladness, hardly ever like the school; while stupid dunces, who have no pleasure with other children, are the bright ornaments there. If there is a boy among them who has too much good sense to keep his eyes for hours fixed on a dozen letters which he hates; or a merry girl, who, while the school-master discourses of spiritual life, plays with her little hands all sorts of temporal fun under the desk, the master, in his wisdom,

declares these the goats who care not for their everlasting salvation."—*Pestalozzi*.

QUESTIONS FOR DISCUSSION AT TOWNSHIP INSTITUTES.

[For methods of using these questions our readers are referred to the January number, 1880.]

ORTHOGRAPHY.

1. Define Letter, Word, Analysis, Derivation, and Structure of Words.
2. Write and define five derivatives from the word *ply*.
3. Write five names of places, so as to indicate the pronunciation by spaces and diacritical marks.
4. Classify the letters used in writing the names of the town, County, and State in which you reside.
5. Construct ten derivatives from the root word, *press*, and show how each prefix or suffix modifies the meaning of the primitive term.

READING.

1. What is Reading?
2. Describe the difference between Reading, Reciting, and Declaiming, as school exercises.
3. Define Inflection, Emphasis, Cadence, and Modulation.
4. What ends are to be secured by class exercises in reading?
5. How can you best teach pupils to acquire knowledge by school reading?

ARITHMETIC.

1. Name and define the different systems of Notation.
2. Give the principles of the Roman notation.
3. Having given the difference in time between two places, how can the difference of longitude be determined?
4. Define simple interest, compound interest, annual interest.
5. State the difference between true and bank discount.

GRAMMAR.

1. Define Grammar, Language, Phrase, Clause, Sentence.
2. Explain the grammatical changes in reducing subordinate clauses to phrases.
3. Illustrate the above by examples.
4. Write a sentence containing three clauses, and then reduce the same so as to express the meaning in one simple sentence.
5. Analyze: "Whom the gods wish to destroy, they first make mad."

GEOGRAPHY.

1. Represent by shaded bands the zones of the earth, and write underneath a topical outline of the *climate, vegetation, cultivated products, and animals* found in each.

2. Name the mountain ranges of the U. S., and the States through which they extend.
3. Give a topical outline of the products and industries of the U. S., grouping together those States in which the same products are found.
4. Draw a map of New York, and write a comprehensive outline of the State.
5. Describe the physical features of Australia.

U. S. HISTORY.

1. What was the Continental Congress? How composed? Give its history.
2. Give the causes and results of the War of 1812.
3. Give the history of the formation and adoption of our constitution.
4. Outline the powers of Congress as prescribed by the Constitution.
5. Give the organization of the Judiciary, and state the cases in which the Supreme Court has original jurisdiction.

PHYSIOLOGY.

1. How do organized and unorganized substances differ in *structure* and *elements*?
2. Name the functions of organic and animal life, and state their distinguishing difference.
3. Describe the spinal column and its use in the system.
4. What examples of the lever have we in the muscles?
5. Define chylicification and assimilation.

THEORY AND PRACTICE.

1. State the ends sought in school organization.
2. How would you classify an average common school?
3. Name the leading principles which underlie all correct teaching.
4. Define and illustrate the synthetic and analytic processes of education.
5. How far is the teacher responsible for the morals of his school?

BUT that which was much more the real essence of his self-education, was the never-ceasing and strenuous course of laborious thought and reasoning that he kept up, upon the meaning, the connection, the tendency, the right and wrong, the helps and remedies, of all the past facts he read of, or of the present facts that he experienced in life. And this education he not only began early and pursued effectively, but he never ceased it. All his life he maintained that course of steady labor after practical knowledge and practical wisdom. Whenever he could read a good book he did, and his practice for a long time was, after having finished it, to write out an analysis of it; a very fatiguing but very improving process.—*Mrs. Stowe's Life of Abraham Lincoln.*

GRAMMAR DEPARTMENT.

BY F. P. ADAMS.

Diagram and parse:

"Count that day *lost* whose low descending sun
Views from thy hand no worthy action done."

O. P. HEDGE, *Humboldt, Kan.*

[	[thou]	count | [to be] lost | day	{	that	{	whose
				[sun		low
						descending
						from hand | thy
[views	{	action	{	no		
				worthy		
					done.	

Count is a verb in the imperative mode, trans., used in the sense of *consider*.

[*To be*] *lost* is an inf., with the construction of a noun, obj. of *count*.

[Vol. II, No. 11, Q. 1, p. 369.]

With grave

Aspect he rose, and in his rising *seemed*
A pillar of state; deep on his front *engraver*
Deliberation sat, and public care;
And princely counsel in his face yet shone,
Majestic, though in ruin.

—Milton.

[	[he	rose | With Aspect | grave			
			and			
			[he]	seemed [to be] pillar	{	A
{	in rising | his;					

[	Deliberation | engraven	{	deep		
			on front | his			
			and			
			care | public			
{	sat	{	(And)			
[	counsel | princely	{	yet		
				shown	{	his
						Majestic
{	in face	{	in ruin			

Seemed to be pillar is a simp. pred. *Seemed* is the copula and [*to be*] *pillar* is the attribute of the second class, of which attribute *to be* is the copula and *pillar* is the attribute. Some have made an error in considering *seemed to be* the copula. *Seemed* is the cop., and [*to be*] is the cop. of the abridged proposition, "to be pillar."

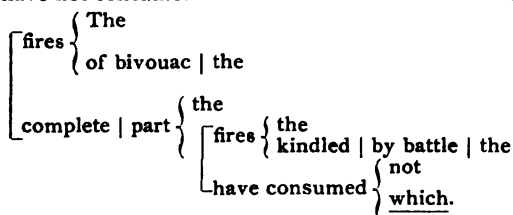
Engraven is a participle with construction of an adjective limiting *deliberation*. It may also limit *care*.

Majestic is an adjective limiting *face*.

Diagram:

The fires of the bivouac complete what the fires kindled by the battle have not consumed.

C. U., Portersville, O.

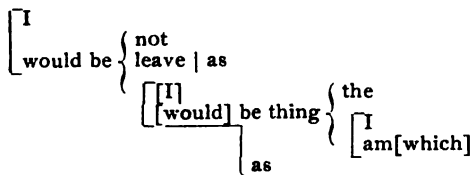


[Vol. II, No. 11, Q. 2, p. 369.]

Diagram and parse:

I would *as* leave not be, as be the thing I am.

R. LEWIS, Deep River, Ind.



Would be is an attributive verb, used in the sense of exist.

[*Would*] *be* is copula.

The first *as* is an adv., mod. the adv. *leave*.

The second *as* is a conj. adv. modifying the copula [*would*] *be* and subordinating the sentence to *would be*.

[Q. 3.]

Parse:

I beheld *Satan as lightning fall* from heaven.

J. E. McMULLEN, Arcadia, Ind.

Satan is objective, subj. of the infinitive [*to*] *fall*.

As is a prep., shows the relation of *lightning* to [*to*] *fall*. *As* equals *after the manner of*, a complex preposition.

Lightning is the object of prep. *as*.

[*To*] *fall* is an infinitive with the construction of a noun obj. of *beheld*.

[Q. 4.] Parse:

I wish to be *Napoleon*.

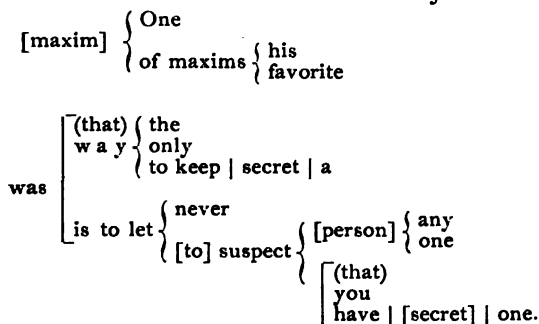
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Napoleon, nom., pred. of the verb, *to be*, referring to the same thing as its subject *I*. The subj. of the infin. is the same as the subj. of the finite verb, consequently the pred. is in the nominative case.

Diagram:

One of his favorite maxims was, that the only way to keep a secret is never to let any one suspect that you have one.

J. W. SEESE, *Strasburg, O.*



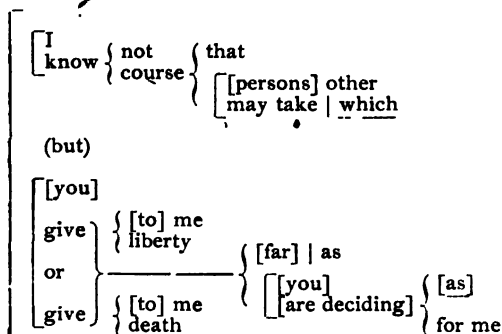
[Vol. II, No. 10, p. 328.]

1. I know not what course others may take *but as for me* give me liberty, &c.

Supply an ellipsis thus:

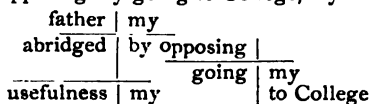
but as [far as you are deciding] for me.

It can then be easily disposed of.



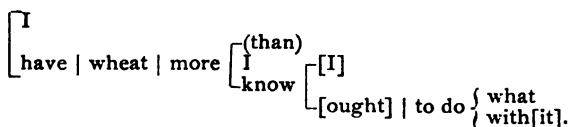
[Q. 2.]

By opposing my going to College, my father abridged my usefulness.

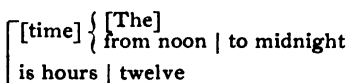


C. A. P., *Berlin, Ill.*

[Q. 3.]

I have more wheat than I know *what to do with*.*What* is an indirect interrogative pronoun, obj. of *to do*.

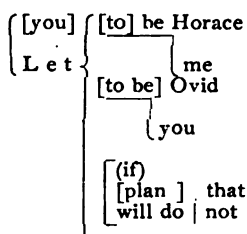
[Q. 4.]

From *noon to midnight* is twelve hours.*Noon* is the obj. of *from*.*To* shows the relation of *midnight* to *noon*.*Midnight* is the obj. of *to*.

[Q. 5.]

My dear *Tibullus* if that will not doLet me be *Horace*, and *Ovid* you.

J. H. STAGG.

*Tibullus*, nom. case, absol. by direct address.*Horace*, obj. in the predicate with *(to) be* referring to *me*.*Ovid*, obj. in the pred. with *(to be)*, referring to *you*.(Q. 6.) He is *at liberty* to go.

He

is at liberty | to go.

At liberty is the attribute of the sentence. It is used in the sense of *free**To go* mod. *liberty*. It is a 2nd cl. adj. el.

Parse:

They might have finished their task *yesterday*.B. H., *Rei, Ind.**Yesterday* is an adv. of time, mod. *might have finished*.

Diagram:

I found him better than I expected to.

Neither is he nor I capable of harboring a thought against your peace.

J. N., *New Burnside, Ill.*

$\left\{ \begin{array}{l} \text{I} \\ \text{found} \mid (\text{to be}) \text{ better} \end{array} \right. \left\{ \begin{array}{l} (\text{than}) \\ \text{I} \\ \text{expected} \mid \text{to}(\text{find}) \mid [\text{him.}] \end{array} \right.$
 $\left. \begin{array}{l} \\ \text{him} \end{array} \right\}$

$\left[\begin{array}{l} \text{he} \\ \text{is (capable)} \mid (\text{mod. by same as } \textit{capable below}). \end{array} \right.$
 (neither—nor)
 $\left[\begin{array}{l} \text{I} \\ \text{am capable} \mid \text{of harboring} \end{array} \right. \left\{ \begin{array}{l} \text{thought} \mid \text{a} \\ \text{against peace} \mid \text{your} \end{array} \right.$

NOTES AND QUERIES.

MATHEMATICS.

1. I have some corn worth \$30. If the number of the bushels be added to the price per bushel, each being considered for that purpose an abstract number, the sum will be $117\frac{1}{2}$. How many bushels of corn have I, and at what price per bushel?
 P. M. McCLAY, *Coldwater, Miss.*

2. A man aged 45 insures his life for \$7500 on the single-payment plan, and dies 3 yrs., 5 mo. afterward. How much less would his insurance have cost him had he insured on the annual payment plan, reckoning interest at 6%?
Id.

3. A stone was dropped into a well. It was observed that after being dropped, it was ten seconds before the sound of the fall at the bottom reached the ear. What is the depth of the well?
 CORNELIUS DILLY,
Sullivan, Ind.

MISCELLANEOUS.

1. Who were the "Round heads" and why so called?

G. L. ROBERTS, *Adams, Ind.*

2. Why do the inhabitants of a mountainous country always prize liberty so highly?
Id.

3. Why do we hear sounds so much plainer when the air is damp?

J. CARSON MILLER, *Moore's Store, Va.*

4. What is the origin of the "Amruta cup?"

J. W. DEPRIEST, *Owensville, Ind.*

5. Why is the rainbow always seen bent in the shape of a bow?

L. E. K., *Huntington, Ind.*

ANSWERS.

1. [Vol. II, No. 11, Q. 4, p. 368.]

$8^3 \times .5236 = 268.0832$ cu. in. = solidity of globe.

Suppose this to lie in a flat surface one in. thick. Now to reduce the thickness to $\frac{1}{2}$ in. would extend it over 5 times its present space.

$268.0832 \times 5 = 1340.4160$ = surface of globe.

$1340.4160 + 3.1416 = 426.26666 +$ = sq. of diameter. $\sqrt{426.26666 +} = 20.65 +$ = diameter of globe. $20.65 + \times .5236 = 4610.6250 +$ = cu. in. inside of globe. $4610.6250 + + 231 = 19.95 +$ gal.

S. A. KAGY, Findlay, O.

2. [Vol. II, No. 11, Q. 7, p. 368.]

Let 8 in. = diameter of globe.

$8^3 \times .5236 = 268.0832$ = solidity of globe.

Radius of sphere $\times 1.1547$ = side of inscribed cube.

$4 \times 1.1547 = 4.6188$ = one side of cube.

$4.6188^3 = 98.5232 +$ contents of cube.

$169.56 + + 6 = 28.26$ = contents of one side.

1000 oz. $+ 268.0832 = 3.75 +$ oz. = oz. in one cu. in.

$28.26 \times 3.73 = 105.4098 +$ oz.

Extending farther into dec. would give ans. more exact.

Id.

3. [Vol. II, No. 11, Q. 8, p. 368.]

If an article had cost me $12\frac{1}{2}\%$ more, my rate of gain would have been 5% less, what was my rate of gain?

Ans. Let $112\frac{1}{2}\%$ = cost; on $12\frac{1}{2}\%$ of cost, gain 5%, on 1% gain $\frac{1}{2}\%$, and on 112% cost, gain 45%. All similar questions may be solved in this manner.

F. GILLUM CROMER, Union City, Ind.

4. [Vol. II, No. 9, Q. 11, p. 281.]

Two wheels, one 5 ft. in diameter, the other 8 ft. in diameter, are connected by an axle 6 ft. long. The axle turning with the wheels; how many revolutions will they make in describing a circle?

Ans. $8 - 5 = 3$; $3 : 6 :: 8 : 16$ ft. = radius of outer circle; $16 \times 2 = 32$; $32 + 8 = 4$ revolutions.

J. W. JONES, Circleville, O.

5. [Vol. II, No. 9, Q. 8, p. 281.]

How much money must I invest in bonds bearing 6% int. per annum, bought 20% dis., brok. 2%, in order to receive an annual income equal to the P. W. of \$1,025, due in 1 yr., 4 months, and 20 days hence, at 10%?

Ans. The amt. of \$1 for 1 yr. 4 mon. and 20 days, at 10%, is \$1.38 $\frac{1}{2}$; $\$1,025 + \$1.38\frac{1}{2} = \$900$ P. W. $\$1 \times 6\% = .06$; $\$900 + .06 = \15000 , par value of stock. Let 100% = face of bonds. $100\% - 20\%$ dis. = 80%, cost of bonds.

$80\% \times 2\%$ brok. = 1.6 brok.; $80\% + 1.6 = 81.6$; $\$15000 + 81.6 = \12240 , my investment.

GEO. E. MORGAN, Sciota, O.

6. [Vol. II, No. 11, Q. 3, p. 268.]

How much land worth \$40 an acre must be added to a farm containing 50 A. 2 R. 20 P. worth \$70 an acre, to make an average value of \$50 an acre?

Ans. On each A. worth \$70 sold, at \$50 the loss is \$20.

" " \$40 " gain " \$10.

Hence to make the gain and loss equal, two A. at \$40 must be taken with one at \$70. Then with 50 A. 2 R. 20 P. at \$70 an A. there must be taken 101 A. 1 R. at \$40 an A. so that the whole may be worth \$50 an A.

G. M. HUSTON, *Huntingburgh, Ind.*

7. [Vol. II, No. 8, Q. 4, p. 239.]

Who invented the Alphabet?

"The alphabet of any language is the series of letters, arranged in the customary order, which form the elements of a language when written. It derives its name from the first two letters of the Greek, which are named *Alpha, beta*. The letters of the English alphabet have the same form as those of the Latin language, which are borrowed from the Greek. The Latin alphabet, however, did not contain all the Greek letters. The letters of the Greek alphabet were borrowed from the Phœnicians, which was that used by the old Semitic nations, and is of an *unknown origin*. It consisted of 22 signs, representing consonantal sounds. Into this alphabet the Greek introduced many modifications, and the changes by the Romans were also considerable."—*Cyclopædia of Education, Kiddle and Schem, p. 24.*

E. P. CLEMENS, *Darke, O.*

NOTES.

CRITICISM ON AN ANSWER.

[Vol. II, No. 7, Q. 11, p. 204.]

Suppose two clocks are together Monday noon, and that one gains 2 minutes and 5 seconds each day, while the other loses 3 minutes and 26 seconds in two days. How much will they disagree at the end of the week?

F. Gillum Cromer, Union City, Ind., is *incorrect* in two particulars.

1. He says from Monday noon to the end of the week is $5\frac{1}{4}$ days. It is *not* $5\frac{1}{4}$ days, but $5\frac{1}{2}$ days. The difference which he gives for one day is correct, viz., 3 minutes, 47 seconds.

2. But $3 \text{ min. } 47 \text{ sec.} \times 5\frac{1}{4} = 19 \text{ min. } 51.75 \text{ sec.}$ instead of $21 \text{ min. } 51.75 \text{ sec.}$ Now $3 \text{ min. } 47 \text{ sec.} \times \text{by } 5\frac{1}{2} = 20 \text{ minutes, } 48.5 \text{ seconds}$ the correct answer.

Z. T. TURNER, *Eleroy, Ill.*

It is recorded that God opened the heavens to the patriarch of old, and showed him a ladder leading thither. This ladder is let down to every descendant of Adam; it is offered to thy child. But he must be taught to climb it. And let him not attempt it by the cold calculations of the head, or the mere impulse of the heart; but let all these powers combine, and the noble enterprise will be crowned with success. These powers are already bestowed on him, but to thee it is given to assist in calling them forth.—*Pestalozzi.*

✓ EXAMINATION DEPARTMENT.

QUESTIONS PREPARED BY THE INDIANA STATE BOARD OF EDUCATION, FOR THE EXAMINATION OF TEACHERS IN JANUARY, 1880.

WRITING.

1. Draw a schedule of ruled lines as they are drawn in copy-books and write therein one small letter requiring in height only one of the spaces, another filling two, another three, another four, and another five. 20.
2. Describe the construction of the letter t by stating how many and what kinds of lines make it up. Same of l. 10.
3. Write the first 10 capital letters. 10.
4. What part of the arm should rest on the desk? What part of the hand should touch the desk?

Let the penmanship of the candidate as shown in the answers to the above questions be marked from 1 to 50 according to the judgment of the Superintendent.

ORTHOGRAPHY.

1. Give five subdivisions of the letters of the alphabet and give a definition of each division. 5 pts., 2 each.
2. (a) What sounds has the letter o? (b) Give words illustrating its different sounds. a=5; b=5.
3. Syllabicate and mark the accent of *specimen* and *parallelogram*. 2 pts., 5 each.
4. What rule of orthography is illustrated in spelling the past tense of the verb *prefer*? 2 pts., 5 each.
5. Write the words *programme* and *national* phonically indicating the sound of each letter by the proper mark. 2 pts., 5 each.
6. Spell ten words pronounced by the Superintendent. 5 for each.

READING.

"To him who in the love of nature holds
Communion with her visible forms she speaks
A various language: for his gayer hours
She has a voice of gladness and a smile
And eloquence of beauty: and she glides
Into his darker musings with a mild
And healing sympathy, that steals away
Their sharpness ere he is aware."

From "Thanatopsis."

1. Who was the author of this poem? Name one other poem he has written. 2 pts., 5 each.
2. Express in other words the principal thoughts of the above quotation. 10.
3. What single word or phrase in the first two and a half lines should receive the principal emphasis? Why? 2 pts., 5 each.
4. Define emphasis. How does it differ from accent? 2 pts., 5 each.
5. Indicate the sounds in the following words, using diacritical marks when necessary: Visible; beauty; ere; nature; has. 10.

Let the candidate read a selection at sight, upon which he shall be marked according to the judgment of the Superintendent, from 1 to 50.

ARITHMETIC.

1. Reduce 172 lb troy to pounds avoirdupois. Proc. 6; ans. 4.
2. What will $\frac{3}{5}$ of a ton of coal cost at \$3.75 per ton? By analysis. Anal. 5; ans. 5.
3. Define decimal scale, decimal unit, and a decimal fraction. 3 pts. 4 off for each omitted.
4. A perpendicular rod $5\frac{1}{3}$ ft. long casts a shadow $8\frac{1}{4}$ ft. in length, what is the height of a steeple which at the same time casts a shadow 182.23 ft. in length? By Proportion. Stat. 3; proc. 3; ans. 4.
5. A man sold a horse for \$275 and gained 25 per cent. What did the horse cost? How much did he make? What per cent. was the selling price of the cost price? Proc. 4; each ans. 2.
6. A note for \$845 was given Aug. 4, 1874, the rate being $8\frac{1}{2}$ per annum. It was endorsed as follows: June 10, 1875, \$56; December 19, 1876 \$139.55; what was due Sept. 4, 1877? Proc. 6; ans. 4.
7. Define premium and brokerage. 2 pts., 5 each.
8. A rectangular farm sold for \$5040, the price being \$80 per acre. The farm was 140 rods long, how wide was it? Proc. 5; ans. 5.
9. What will it cost to plaster the walls and ceiling of a room which is 30 ft. long, 18 ft. wide, and 15 ft. high, at 10 cents per square yard? Proc. 5; ans. 5.
10. What is of the largest square stick of timber that can be made from a log which is 4 ft. in diameter? Proc. 5; ans. 5.

GRAMMAR.

1. Write the plurals of radius, Timothy, brother-in-law, and cargo. 2 off for each error.
2. Compare bad, many, beautiful, chimney, square. 2 off for each error.
3. What tenses, of what moods can be formed without auxiliaries? 10.
4. What are the principal parts of the verbs, *make, lay, set, ride, write*? 1 off for each error.
5. Write a sentence containing two singular subjects taken separately. 10.
6. We think in words; and when we lack fit words, we lack fit thoughts. Parse *words* and *words*. 2 pts., 5 each.
7. Analyze the above. 10.
8. Give five words commonly used as interjections. 2 off for each error.
9. Give two rules for the use of Capital letters. 2 pts., 5 each.
10. Correct—I *expected to have found him at home*, and give a reason for the correction. 2 pts. 5 each.

GEOGRAPHY.

1. Define Circle and Meridian as used in Geography. 2 pts., 5 each.
2. Of what does the surface of the earth consist? What is the proportion of each? 2 pts., 5 each.

3. What similarity exists between the southern extremities of the two hemispheres?
4. Name four particulars in which mountains are of importance.
4 pts. 3 off for each error.
5. What is the most important ocean current known? In what does its importance consist?
2 pts., 4, 6.
6. Name five leading exports and five leading imports of the U. States
10 pts., 1 each.
7. Which eastern State has no seaboard? Upon what body of water does it border?
2 pts., 5 each.
8. What countries constitute the Scandinavian Peninsula?
2 pts., 5 each.
9. Going directly south from Glasgow, name, in order, the countries through which you would pass in reaching the Mediterranean Sea.
5 pts., 2 each.
10. Name the capitals of the following countries,—Austria, Belgium, Portugal, German Empire, Italy.
5 pts., 2 each.

HISTORY.

1. Name the two principal discoveries by Columbus. 2 pts., 5 each.
 2. Why were the Aborigines of America called Indians? 10.
 3. Narrate the early settlement of Massachusetts.
 4. (a) Who was Gen. Thomas Gage, and (b) what part did he take in the American Revolution?
a=4; b=6.
 5. Tell the story of the Battle of Lexington. 10.
 6. What was the purpose of the Articles of Confederation, 1777? 10.
 7. (a) What nation first recognized the independence of the United States? (b) In what year?
a=6; b=4.
 8. (a) From whom and (b) in what way was Louisiana acquired by the United States?
a=3; b=7.
 9. What territory constituted Louisiana at the time of its acquisition?
10.
 10. How was slavery first introduced into this country? 10.
- NOTE.—Narratives and descriptions should not in any case exceed six lines.

PHYSIOLOGY.

1. How are the bones of the head divided, and how many bones in each division?
2 pts., 5 each.
2. Describe a ball-and-socket joint, and locate two. 2 pts., 5 each.
3. What is the distinction between extensor and flexor muscles? 10.
4. Name and locate the four classes of teeth. 2 pts., 5 each.
5. What is the use of saliva? Of gastric juice? 2 pts., 5 each.
6. What is the object of the pulmonic circulation of the blood? 10.
7. What is the distinction between sensory and motor nerves? 10.
8. What is the office of the pores of the skin? 10.
9. Why is pure air essential to health? 10.
10. What is the tympanum of the ear, and what is its use? 2 pts., 5 each.

THEORY AND PRACTICE.

1. What is the difference between a lesson and a recitation? 20.
2. Give the three principal objects of a recitation. 20.
3. Why should the black-board be used in teaching writing? 20.
4. What are the advantages of the pronouncing of the syllables in oral spelling? 20
5. What is the chief object of school government? 20.

ANSWERS TO STATE BOARD QUESTIONS, FOR JANUARY, 1880.

IN SPECIAL CHARGE OF ANNIE M. SHERRILL.

The Number of the Answer Corresponds to the Number of the Question.

ORTHOGRAPHY.

1. (a) The alphabet consists of forty elementary sounds. These are divided into two great classes known as Vowels and Consonants. Consonants are divided into two general classes, called Subvocals and Aspirates. Consonants are again divided into six classes, the first of which may be called Labials. (b) Vowels are those sounds which are made with the vocal organs open, and consist of pure tone only. Subvocals are those sounds which are obstructed by the vocal organs, in the process of articulation. Aspirates are mere emissions of the breath, articulated by the lips, tongue, teeth and palate. Labials are *lip-sounds*, which are made by the lips.

2. O, long, as in Old.
O, short, as in Odd.
O, like short u, as in Other.
O, like long oo, as in Prove.
O, like short oo, as in Bosom.
O, like broad a, as in Order.
OO, as in Moon.
OO, as in Wool.

3. Spec'i-men.
Par'al-lel'o-gram.

4. Monosyllables and words accented on the last syllable ending with a single consonant preceded by a single vowel double that consonant on receiving a termination beginning with a vowel.

5. P-r-o-g-r-a-m.
N-a-sh-u-n-a-l.

READING.

1. William Cullen Bryant. "Little People of the Snow."
2. Nature speaks many and various languages to him who loves and communes with her. She makes his gay hours gayer and steals from him his sorrow and anguish.

3. Holds communion. Because it is the most prominent and important, and must be emphasized in order to bring out the full meaning.

4. Emphasis is a special stress of voice upon one or more words of a sentence, to give them the prominence and importance the author intends. Accent is that stress of voice by which one *syllable* of a word is made more prominent than others.

ARITHMETIC.

1. 1 lb troy = 5760 grains.

172 lb troy = 172 times 5760 gr. = 990720 gr.

In one lb Av. there are 7000 gr. In 990720 gr. there are as many lb Av. as 7000 is contained times in 990720, which are $141\frac{23}{175}$ times.

Therefore 172 lb troy = $141\frac{23}{175}$ lb Av.

2. $\frac{2}{3}$ of a ton of coal will cost $\frac{2}{3}$ as much as one ton. If one ton cost \$3.75, $\frac{2}{3}$ will cost $\frac{2}{3}$ of \$3.75 = \$2.50.

3. A Decimal scale is one in which the values of the orders of units increase by the constant multiplier, and decrease by the constant divisor 10. A decimal unit is one of the equal decimal parts into which a thing, or the unit 1 is divided. A decimal fraction is one whose denominator is 10 or some power of 10.

4. $8\frac{1}{2} : 182.23 :: 5\frac{1}{2} : (?)$

$\frac{5\frac{1}{2} \times 182.23}{8\frac{1}{2}} = 110.44\frac{8}{11}$ ft. = height of steeple.

5. Let 100% = Base = cost price. Then 100 per cent. + 25 per cent. = 125 per cent. = \$275 = selling price. If \$275 = 125 per cent. of cost price, 1 per cent. = $\frac{1}{125}$ of \$275 = \$2.20. And 100 per cent. = 100 times \$2.20 = \$220 = cost price. He made the difference between \$275 and \$220, which is \$55. \$275 is as many per cent. of \$220 as 1 per cent of \$220 is contained times in \$275.00. 1 per cent. of \$220 = \$2.20. $\frac{275}{2.20} = 125$ per cent.

Therefore, the selling price is 125 per cent. of the cost price.

6. \$57.46 = Int. on face (\$845) from Aug. 4, 1874, to June 10, 1875, being 10 mo., 6 da., at 8 per cent. per annum.

\$56.00 = payment made, being less than int.

\$1.46 = Surplus int. not paid to June 10, 1875.

\$103.09 = Int. on prin. (\$845) from June 10, 1875 to Dec. 19, 1876, being 1 yr., 6 mo., 9 da.

$\frac{1.46}{845.}$

\$949.55 = Whole sum due Dec. 13, 1876.

139.55 = payment made.

\$810. = Bal. due Dec. 19, 1876.

\$45.90 = Int on bal. (\$810) to Sept. 4, 1876, being 8 mo., 15 da.
810.

\$855.90 = Whole amt. due Sept. 4, 1877.

7. Premium is the amount for which money, stocks, bonds, and drafts sell, above their nominal value. Brokerage is the commission charged by Brokers.

8. $\frac{\$5040}{80} = 63 = \text{No. of Acres in the farm.}$

$160 \times 63 = 10080 = \text{area of farm in rds.}$

$\frac{10080}{140} = 72 \text{ rds.} = \text{width of farm.}$

9. $30 \text{ ft.} \times 15 \times 2 = 900 \text{ sq. ft.} = \text{area of sides.}$

$18 \text{ ft.} \times 15 \times 2 = 540 \text{ " " " " ends.}$

$30 \text{ ft.} \times 18 = 540 \text{ " " " " ceiling.}$

$1980 \text{ " " " " walls and ceiling.}$

$\frac{1980 \text{ sq. ft.}}{9} = 220 = \text{no. sq. yds. in walls and ceiling.}$

At 10 cts. per sq. yd., 220 sq. yds. will cost 220 times 10 cts., = \$22.00 = cost of plastering.

10. One side of the square piece of timber would be represented by a square inscribed in a circle whose diameter is 4 ft. The diagonal of the square would also be 4 ft., and would divide the square into two right-angled triangles of which it is the hypotenuse. We have given, then, the hypoth. to find one of the equal sides.

Since in any right-angled triangle the square of the hypoth. is equal to the sum of the squares of the other two sides, we have, in either triangle $(4 \text{ ft.})^2 = 16 \text{ sq. ft.} = \text{the sum of the squares of the other two sides.}$ Since the sides are equal their squares are equal and one of them is equal to $\frac{1}{2}$ their sum.

Therefore the square of one side equals one half of 16 sq. ft., = 8 sq. ft., and $\sqrt{8} \text{ sq. ft.} = 2.82 + \text{ft.} = \text{a side.}$ The cubic contents of the square piece of timber of which each dimension is $2.82 + \text{ft.} = (2.82 + \text{ft.})^3 = 22.42 + \text{cu. ft.}$

GRAMMAR.

1. Radii; Timothies; brothers-in-law; cargoes.

2. Bad, worse, worst; many, more, most; beautiful, more beautiful, most beautiful. Chimney and square can not be compared.

3. Indicative mode, (present and past tenses). Subjunctive mode, (present and past tenses). Infinitive, Imperative, and participial modes of the active voice.

4. Prin. parts of the verb *make*, are make, made, made; lay, laid, laid; set, set, set; ride, rode, ridden; write, wrote, written.

5. Neither man nor beast escaped.

6. Words, noun, com., 3d, plu., neut. As it first occurs in the sentence it is in the objective case, obj. of prep. 'in.' And as used in the second clause it is in the obj. case, obj. of verb 'lack.'

7.

{ we
 think | in words
 and
 { we
 lack { thoughts | fit
 (when)
 { we
 lack | words | fit

8. O, hark, hurrah, pshaw, hail.

9. Capitals should be used to begin direct quotations. Capitals should be used to begin all proper names.

10. I had expected to find him at home. Verbs expressing hope, expectation, command, intention, &c., require the present infinitive after them.

GEOGRAPHY.

1. In order to locate places on the earth as well as to represent portions of its surface on maps, we imagine it to be encircled by a number of lines of which there are two kinds, called great and small circles. The meridians are great circles of the earth which pass through both poles. The meridian of any given place, is the great circle that passes through that place and both poles. There are as many meridians as there are places on the equator or on any parallel.—*Houston*.

2. The surface of the earth consists of land and water in the proportion of 53 parts of the former to 144 of the latter.

3. The great land masses of the southern portions of the two hemispheres are triangular and point to the south.

4. Mountains act as condensers of the moisture of the atmosphere causing it to be precipitated in the form of rain. Valuable minerals are stored away in the mountains where they are easier of access than if down below the surface of the level plain. They add greatly to the beauty of a country. They affect the climate of adjacent countries by protecting them from cold winds.

5. The most important ocean current is the Gulf Stream. It greatly modifies the climate of the British Isles and other portions of Europe.

6. The U. S. exports bread stuffs, cotton, pork, beef and tobacco. It imports tea, coffee, sugar, spices and tropical fruits.

7. Vermont. It borders on Lake Champlain.

8. Norway and Sweden.

9. Wales, England, France and Spain.

10. Vienna, Brussels, Lisbon, Berlin, Rome.

HISTORY.

1. The island of Guanahani and the main land of South America near the mouth of the Orinoco.

2. They were so named by Columbus because he supposed the land he discovered was a part of India.

3. On the 21st of December, 1620 a hundred Pilgrims or Puritans landed from the *Mayflower* on the shores of New England. They established a settlement and called it Plymouth. They suffered greatly the first winter

from the severity of the climate, afterwards from a failure of their crops, but finally grew and prospered. In 1629 John Endicott and others obtained a grant of land about Massachusetts Bay and established another settlement which also became prosperous.

4 and 5. Gen. Thomas Gage was appointed Governor of Massachusetts and commander of the British troops stationed in Boston. On the 19th of April 1775 he sent Major Pitcairn with a body of troops to Concord to destroy some military stores. At Lexington they were attacked by the Americans and badly beaten. This was the first battle of the Revolution.

6. The Articles of Confederation were designed as a bond of union between the States and as a code of laws for their government in their corporate capacity as a nation.

7. France, in the year 1778.

8. From France, by purchase.

9. The territory included under the name of Louisiana included all the country west of the Mississippi except the present States of Texas, California, and Nevada, and the Territories of Utah, New Mexico and Arizona.

10. In 1620 some Dutch merchants brought a number of negroes from Africa and sold them to the colonists.

PHYSIOLOGY.

1. Cranium, eight bones. Face, 14 bones.

2. A ball and socket joint is so constructed as to allow free motion in all directions. The end of the bone is convex or hemispherical and fits into a concave socket. The shoulder and hip joints are examples.

3. Extensor muscles by their contraction straighten or extend the limb. Flexor muscles bend the limb.

4. The incisors located in the front of the jaws, the canine next to the incisors, the bicuspid next to the canine and lastly in the back part of the jaw, the molars.

5. The use of the saliva is to moisten the food to assist in mastication and deglutition and also aids in digestion by its action on the starchy elements of the food. The gastric juice dissolves the food in the stomach converting it into chyme.

6. The blood in circulating through the lungs gives off carbon and receives oxygen.

6. There are nerves which are specially engaged in motion, and others, such as the optic nerve, which specially generate sensations. Either class may be injured without any damage to the other. Thus, a blind man rolling his eyes, shows that, though his optic nerve is blighted, the motor nerves are in full function. So a limb may be *paralyzed*—that is deprived of all motion—and yet be very sensitive. If a motor nerve be divided and a galvanic current applied to the portion of the nerve connected with the muscles, the muscle contracts. This shows that the motor nerves act like telegraphic wires.—*First Lessons in Physiology, C. L. Hotze.*

8. The pores afford an outlet for the secretions of the skin, also extraneous substances are taken into the circulation by absorption through the pores.

9. The blood which has circulated through the system is loaded with impurities which must be removed. This is done in the lungs by contact with pure air.

10. See answer to question 8 in Dec. No. p. 339, also to question 10 in Jan. No. p. 381.

THEORY AND PRACTICE.

1. A lesson may be a certain topic or number of topics assigned by the teacher for the pupil to study, or the teacher may give information in the form of a lecture or talk which may be called a lesson. A recitation is the combined work of the teacher and pupils, the former giving instruction and advice, the latter reciting or telling what they have learned from the lesson assigned.

2. The three principal objects of a recitation are Examination, Instruction, and Cultivation. By the first the teacher finds out what the pupils know and is then better able to assign future lessons or impart information. The pupil also gains strength and fixes in his mind what he has learned. By the second the pupil receives information imparted by the teacher or other pupils. The third includes the other two and also such criticisms as the teacher and other pupils may give and the benefit derived from class drills and from written work.

3. The black-board should be used in teaching penmanship because the teacher can explain elements and point out faults to the whole class at once, thus saving time.

4. If the syllables are pronounced the words can be more easily pronounced. It is a kind of analysis of the word.

5. Discipline of some kind must exist before instruction can be given. A school can not exist as a school without some kind of government. Either it must govern itself or be governed by the teacher. That teacher who succeeds in making a school govern itself has reached perfection in this line.

AND I must work thro' months of toil,
And years of cultivation,
Upon my proper patch of soil
To grow my own plantation.
I'll take the showers as they fall,
I will not vex my bosom;
Enough if at the end of all
A little garden blossom.

—Tennyson.

COLLEGE DEPARTMENT.

DEVOTED TO THE INTERESTS OF THE CENTRAL NORMAL,
DANVILLE, INDIANA.

CONDUCTED BY G. DALLAS LIND.

DEAR FRIENDS:—The Normal railroad is a broad gauge, all steel rails, solid rock bed, and runs right straight through a beautiful country. Trains stop at all principal stations and stop over checks are given whenever desired. Read the following:

"I heartily commend the culture and masterly training of the Central Normal College. I have visited all the departments and feel that I can not speak too highly of the Normal enthusiasm, systematic training and the general spirit of investigation manifested throughout the Institution. In my judgment the school richly deserves its wide-spread reputation." Rev. G. P. Peale, Pastor Christian Church, Danville, Ind. Jan. 11, 1880.

"We call special attention to the Central Normal College. We have had abundant opportunities to see the workings of this school, and can cheerfully say that the school is doing a royal work; it is patronized by a noble band of students, and is worthy of its growing and liberal patronage. The Institution has lately shown great enterprise in securing the services of Prof. Steele, Dr. Tingley, and Prof. Hamill. Danville is one of the best towns for such a school in the State. Success to our Normal."—[Hendricks County Union.]

"We have carefully watched the Central Normal College since its location in Danville, and our convictions force us to say it is a well managed institution and has become one of the best schools in the country. It is especially suited for students who can not or do not desire to take the long college course. Prof. Adams has taken care to secure first-class instructors. Dr. Joseph Tingley and Prof. S. S. Hamill, teachers of National notoriety will each soon begin a course of instruction in the College. A more pleasant and healthy location than Danville can not be found in the State."—[Hendricks County Democrat.]

R. W. Holland of Lenoxburg, Ky. will be here for the summer term and says he has the promise of two other young men. That's right. Bring them along. They will some time rise up and bless the day they start for Danville.

G. W. Carpenter is teaching successfully at Houston, Ohio.

Walter Saylor, a rising young lawyer of Eaton, O., and brother of Prof. Marcus Saylor, was here visiting a few days last term. He writes after returning home as follows: "I can cheerfully recommend your school to every person in this section and think I can promise you a dozen students from Preble Co., for the summer term."

Miss Lettie J. Huey writes a long and interesting letter from Union, Ind. She tells of the death of her assistant in the school and of the burning of

her school-house this winter. The people expected to be without a school until next fall, but Miss Lettie's Normal enthusiasm contrived to stir up the people to fix up an old work shop adjoining and she is now teaching out the term. She expects to be back to the Normal at close of her school. Normalites are the folks who make things go.

A Lecture Association has been organized in Danville, which promises to give us the opportunity of hearing some of the greatest celebrities of the lecture field. Already this winter we have been entertained by some excellent lecturers, among them we may mention Miss Phœbe Cousins, on "A Woman without a Country," Prof. Eli F. Brown, on "Other Worlds than Ours," Rev. J. C. Fletcher, the great missionary and traveller on "The Bible in Brazil," and "Two Thousand Miles up the Amazon," State Supt. Smart on "The Old World." To-night we are to be entertained by Robt. J. Burdette, the funny man of the Hawkeye, and we have the promise soon of Alf. Burnett and Schuyler Colfax. No other town offers better opportunities of this kind than Danville.

Prof. Adams, Dear Friend:—I am putting in my "best licks" to complete my arrangements in order that I may come to Danville next year. Our Co. Superintendent has employed me at \$3.00 per day, to assist him in a six-weeks "Normal" the coming summer. J. E. Sherrill has appointed me general agent for Decatur, Rush, Henry, Hancock, Delaware, Fayette, Union, Franklin, Ripley, Ohio, Jennings and Bartholomew counties. With kind wishes to you and yours, &c., J. A. H. Stagg, Greensburg, Ind.

T. A. Shafer is teaching at Cambridge City, Ind., and thinks he will be back with us in the Spring.

Ella Griswold writes from Muncie, Ind., as follows: "I never enjoyed myself so much, I think, as I did while attending your Normal and am very anxious to return to it. I am truly glad that your efforts on every hand have been crowned with success. I am teaching in the country near Muncie, and getting along nicely with my school. I seldom tire of school work. We have an excellent Co. Supt., and are having better schools this winter than for several years in this county."

E. E. Cain writes from Clarksburg, Ind., "I am teaching this year near home. Have a very pleasant little school. Next year I expect to take the Scientific course at the Danville Normal. Last year I was foolish enough to go to a college, instead of to the Normal. I came home sick of college and now do not hesitate to say that I would have made more *real progress* at Danville in *one term* than in *three terms* at the college, though it was one of the leading Universities in the State."

Geo. E. Hoover is home again among the good old Pennsylvania Dutch of Mooresville, Pa., and while he is enjoying chestnuts, buckwheat cakes, apples and cider, does not forget the pleasant days spent in the Central Normal.

T. B. Lutz is teaching near Cedar Rapids, Iowa.

Fannie Mickey is teaching near Russellville, Ill., the same school she taught last winter.

PUBLISHER'S DEPARTMENT.

Now is the time to canvass for **THE NORMAL TEACHER** and all of our books. Write for terms at once.

Do NOT fail to write to the Principal of the Central Normal School for full particulars of the Summer Term.

We need July numbers of 1879 of **THE NORMAL TEACHER**. We will extend subscriptions three months for every copy sent. Please respond promptly.

PROF. JOHN OGDEN writes us that his Normal School has recently been incorporated under a State Board of Trustees, thus virtually constituting it a State Institution.

We have a large number of agents in the field who are making good wages. We desire to make engagements for spring and summer with some energetic canvasser in every county in the U. S. Please write for terms and see what we can do for you.

THE NORMAL TEACHER still continues to grow in popularity. This is only No. 1 of Vol. III, yet in point of circulation it is only a little behind the oldest and most widely circulated school journal in the U. S. Advertisers should make a note of this fact.

We have no disposition to exaggerate or place any matter in a wrong light before the public. But we can say confidently that the Central Normal College, Danville, Ind., offers better advantages for the spring and summer terms than any Normal school within our knowledge.

THE NORMAL TEACHER (just two years old), has a larger circulation than any school journal in the U. S. with one exception only. This is a success most gratifying to all interested in Normal work. The thousands of unsolicited testimonials if printed would fill a large volume.

PROF. S. S. HAMILL, in a recent letter from Kansas City, Mo. says: "I have more to do here than ten men could do." Prof. Hamill probably does more work in his line than any Elocutionist in America and perhaps in the world. Let every teacher remember that Prof. Hamill commences his work in the Central Normal College, March 28.

BEST BOOK FOR EVERYBODY.—The new illustrated edition of Webster's Dictionary, containing three thousand engravings, is the *best book for everybody* that the press has produced in the present century, and should be regarded as indispensable to the well-regulated home, reading room, library, and place of business.—*Golden Era*.

WE are in great need of August and September numbers, 1878 and June and July numbers, 1879 of THE NORMAL TEACHER. For any one of these numbers we will give a three month's subscription, or for all four a year's subscription. Those who can spare one or more of these numbers will greatly oblige us by sending in at once.

NEW students are arriving daily to attend the Normal. Some come to make Elocution a specialty; some are after the laboratory work now in charge of Dr. Joseph Tingley; while others are after general ideas in grammar, arithmetic, geography, &c. To one and all who are thinking of attending school, we say come on. We think that we can assure you that everything will surpass your most sanguine expectations.

"DO YOUR books sell?" is a question often asked us by correspondents. In answering we have only to submit the facts and then persons are able to judge for themselves. The Normal Question Book was issued from the press July 28, 1879, and is now in its thirteenth edition. The first edition of Methods of Teaching in Country Schools was issued Jan. 10, 1880 and the fourth edition will soon be ready for delivery. Verily, we should say, *our books do sell.*

NOTWITHSTANDING the fact that paper has risen 100 per cent. in the last six months, so that it costs us a great deal more to print THE NORMAL TEACHER now than it did last summer, yet we propose to keep it at the present subscription price of \$1.00; in clubs of five at 75 cts. This is just about one half that of similar journals (by similar journals we mean those put up in pamphlet form like THE NORMAL TEACHER). We could not afford to publish THE NORMAL TEACHER at such a low price did we not have an immense circulation.

EVERY teacher who possibly can should make arrangements to attend some good Normal school a term or more during the spring and summer. The advantages that will accrue from such a course are too well known to need repeating here. But we have this advice to give: Go where you can enjoy special advantages. Go where you can take a course in Elocution under the best teachers of the Science. Go where you can have the privilege of studying Natural Science in a laboratory under the personal supervision of a master Scientist. Go where you can get most in the least possible time and at the lowest price. Investigate the claims of the different Normal schools and select the best. Do not spend your time at a second or third rate institute when you can attend a first-class Normal School for less money.

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tisements. Again, we do not insert the advertisements of doubtful firms, or of quack nostrums, tobacco, "corsets," &c. We have been offered many such advertisements at good rates but have always refused to give publicity to any thing that tends to destroy either body or mind. As our advertisers are all reliable firms we bespeak for them the patronage of our readers. We hope you will always mention *THE NORMAL TEACHER* whenever you may have occasion to write to any parties whose names are found in our columns.

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BOOK TABLE.

A POPULAR SCHOOL HISTORY OF THE UNITED STATES in which are inserted as a part of the narrative, selections from the writings of Eminent American Historians, and other American writers of note, to which are added the Declaration of Independence and Constitution of the United States, with Copious Notes, fully illustrated with maps, portraits and views. By John J. Anderson, Ph. D. New York, Clark and Maynard, Publishers.

In this little volume we are brought face to face with many of our best historians and noted literary characters. The selections from their writings being interwoven so as to form a connected story of our Country's history, the author has thus accomplished a double purpose. If by its means the student will be led to cultivate a closer acquaintance with the authors here quoted it will serve an important end outside of its value as a text-book of history.

A HISTORY OF ROME, amply illustrated with maps, plans and engravings. By R. F. Leighton, Ph. D. New York, Clark & Maynard, Publishers.

We can best give an idea of this excellent book by quoting from the author's preface: "The book has been prepared on the theory that history

is something more than mere biography and the records of battles; that it sought to set forth the connection of events, showing how each was the product of what preceded and the cause of what followed; that it deals with the inner life of the people; that its aim is, as it were, 'to penetrate into the workshop of the national mind and watch the operations going on there.' Hence an unusual amount of space for a book of this kind has been devoted to the study of the internal government, the inner life, the religion, manners and customs, the influence of foreign conquests and foreign religions, the provincial system, the military organization, military roads &c." The book is printed on fine tinted paper and the typography is excellent.

MOTIVES OF LIFE, by David Swing. Chicago, Jansen, McClurg & Co. Price \$1.00.

Prof. Swing is one of those bold, brave, honest, earnest thinkers, whose subtle thought and simple, earnest and eloquent pleadings for all that is highest, purest and best in human life and conduct, has moved and will continue to move all who are striving for a higher, purer and nobler life.

ON THE PROVINCE OF METHODS OF TEACHING. A Professional Study. By James H. Hoose, A. M., Ph. D. With an Introduction, by Charles W. Bennett, D. D., Syracuse, N. Y.: Davis, Bardeen & Co., Publishers. New York: Baker, Pratt & Co.

The *common* school teacher will find little in this work which will be of practical value to him. The work is almost entirely made up of extracts from leading writers on Education. We are not prepared to say what the book may be as a metaphysical medley, but we are quite confident from a thorough examination, that it is not calculated to give the young teacher any material aid in the practical work of the school-room.

FIRST BOOK IN QUALITATIVE CHEMISTRY. By Albert B. Prescott. New York: D. Van Nostrand, Publisher. 12 mo., 160 pp.

This is one of the many excellent works issued by D. Van Nostrand on Scientific subjects. As an introduction to Analytical Chemistry it is a valuable book and should be in the hands of every student who has studied the general principles of Chemistry. It presents the latest phases of the Science, and in a lucid and simple manner leads the student into the mysteries of chemical manipulation. Chemistry as a science should receive more attention from all classes of students. No other subject presents better claims to notice in this practical age.

BELLE AND THE BOYS, by Mrs. Caroline T. Corbin; author of "Rebecca, or a Woman's Secret," etc. 12 mo., illustrated. Price \$1.25. Jansen, McClurg & Co., Chicago, Ill.

This book is an exception to the great mass of juvenile literature. It is pure, wholesome and good, a charming story with characters excellently drawn and teaching lessons of honesty, generosity, patience and courage. We do not hesitate in advising parents to purchase this book for their children.

MESERVY'S BOOK-KEEPING, Single and Double Entry, by Prof. A. B. Meservy, A. M., Ph. D., Principal of the New Hampton Literary Institution, New Hampton, N. H.—Boston: Thompson, Brown & Co. Thos. H. Bush, Western Agent, 70 Metropolitan Block, Chicago.

As an elementary work on Book-keeping we have seen nothing equal to it. Further praise would be superfluous.

PACKARD'S COMPLETE COURSE OF BUSINESS TRAINING, AND KEY. For Teachers and Private Students. By S. S. Packard, author of Bryant & Stratton's Book-keeping Series, and President of Packard's Business College, New York: S. S. Packard & Co., 805 Broadway. Octavo, 248 pp.

To the teacher of Book-keeping or the conductor of a Business Institute this book will be a valuable aid. To the private student it will, if properly used, be a valuable teacher. We commend the following quotation from "A Few Hints on Methods:" "The teacher should have his own methods, and should use them. They should, also, be the best methods; and if he is not altogether sure upon this point, let him reckon with his conscience at once; for the world is wide, and thought is free, and educational processes are not patented. All that any earnest soul need do is to stretch forth his hand and help himself."

HALF-HOUR RECREATIONS IN POPULAR SCIENCE. Second Series. By John Tyndall, Richard A. Proctor, Prof. Geikie, Balfour Stewart, Prof. Hitchcock, Asa Gray, Prof. Roscoe and others. Selected and Edited by Dana Estes. Boston: Estes & Lauriat.

This book is a large 12 mo., of 445 pp., clearly printed on beautiful tinted paper and neatly bound in cloth with red edges. The names of the authors we have mentioned above ought to be a sufficient index of the character of the contents. They are the leading scientific men of the age. We think every teacher should have a copy of this work. He can make no better investment. The book is provided with a copious index, a valuable part of any book, but which we are sorry to say is lacking in many otherwise valuable books.

A SHORT HISTORY OF GERMAN LITERATURE. By James K. Hosmer, Prof. of English and German Literature, Washington University, St. Louis: Author of "The Color Guard," "The Thirty Bayonet," &c. St. Louis: G. I. Jones & Co.

Few American students are well versed in German literature. Those who know nothing of the beauties of Goethe, Schiller, Heine and others of their class, should read this book. Prof. Hosmer is a pleasing writer and has produced a work that deserves a place in every scholar's library.

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For the purpose designed it seems to be just the thing.

MISTAKES IN TEACHING. By James L. Hughes, Inspector of Public Schools, Toronto, Can. Toronto: W. J. Gage & Co. Philadelphia: Eldredge & Bros. 111 pp.

Contains many valuable suggestions.

THE MOUTH AND THE TEETH. By J. W. White, M. D., D. D. S., Editor of the Dental Cosmos. 150 pp. Brain Work and Overwork. By H. C. Wood, Jr., M. D., Clinical Professor of Nervous Diseases in the University of Pennsylvania, &c, 126 pp. Philadelphia: Lindsay & Blackiston. Price 50 cents each. These little books are Nos. 7 and 10 of the series of Health Primers, edited by W. W. Keen, M. D.

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Studying Art Abroad and How to do it Cheaply. By May Alcott Nieriker. Boston: Roberts Brothers. 87 pp.

A Short German Grammar for High Schools and Colleges. By E. S. Sheldon, Tutor in German in Harvard University. Boston: Ginn & Heath. 102 pp.

One Hundred Choice Selections in Poetry and Prose, No. 17. P. Garrett & Co. Philadelphia and Chicago.

Politics and Schools. The President's Address, Delivered at the Annual Meeting of the Association of School Commissioners and City Superin

tendents of the State of New York. By Sydney G. Cooke, School Commissioner. 23 pp. The Elements of Education. By Charles J. Buell. 25 pp. Half a Hundred Songs for the School-room and Home by Hattie Sanford Russell. Syracuse, N. Y.: Davis, Bardeen & Co.

Circulars of Information of the Bureau of Education, No. 5, 1879, American Education as Described by the French Commissioner to the International Exhibition of 1876, Washington Government Printing Office.

A System of Punctuation for the Use of Schools. By C. W. Butterfield. 32 pp. Price 40 cents. German Irregular verbs by Wm. H. Rosenstengel, Prof. of German in the University of Wisconsin and author of "Lessons in German Grammar," 20 pp. Phonology and Orthoepey, an Elementary Treatise on Pronunciation for the use of teachers and schools. By Albert Salisbury, A. M. 61 pp. The Elements of English Analysis. Illustrated by a new system of diagrams. By Stephen H. Carpenter, Professor of English in the University of Wisconsin. 39 pp. Price 25 cents. Madison, Wis.: Wm. J. Park & Co.

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THE NORMAL TEACHER.

VOL. III. DANVILLE, IND., APRIL, 1880. No. 2.

BEAUTIES OF HIGHER ALGEBRAIC EQUATIONS.

ELIAS SCHNEIDER.

In the May number, 1879, of THE NORMAL TEACHER, two solutions are given of algebraic equations. The author calls them common sense solutions. But they are no sense solutions. He merely substitutes the roots, or answers, in the equations, and then verifies them. But this is no solution.

There are some very interesting beauties in these, and similar equations. It is on this account, also, that I propose to make a somewhat extended examination of a few of these equations. I begin with the following:

$$x^3 + y^3 = 35$$

$x^3 + y^3 = 13$ These equations, I found upon examination, to have six roots, namely $1 + \sqrt{5.5}$; $1 - \sqrt{5.5}$; 3; 2; $-3.5 + \sqrt{-5.75}$; $-3.5 - \sqrt{5.75}$. Four of these roots are real; two are imaginary. One of the equations is an equation of the circle; the other, an equation of a curve, in some respects, similar to that of a parabola, yet differing from it. The four real roots give the four points, at which these two curves intersect each other. Let us solve the equations:

$$x^3 + y^3 = 35 \text{ Let } x = z + v. \text{ Then } x^3 = z^3 + 3z^2v + 3zv^2 + v^3.$$

$$x^3 + y^3 = 13 \text{ and } y = z - v, \text{ and } y^3 = z^3 - 3z^2v + 3zv^2 - v^3.$$

Now, since 27 is not contained in 0, the entire negative root is -3.5 . Divide $z^3 - 9.75z + 8.75$ by $z + 3.5$, and we get $z^2 - 3.5z + 2.5$. This quadratic is easily solved.

$$z^2 - 3.5z = -2.5$$

$$z = 1.75 \pm \sqrt{-2.5 + 3.0625} = .5625$$

$$z = 1.75 \pm .75 = 2.5 \text{ or } 1$$

Hence the three roots of z are 1, 2.5, and -3.5 . Now substitute these three values of z in the equation $v^3 = \frac{13 - 2z^2}{3}$, and we get the three corresponding values of v .

$$v^2 = \frac{13 - 2 \times 1^2}{3} = 5.5 \text{ or, } v = \sqrt{5.5}$$

$$v^2 = \frac{13 - 2 \times (2.5)^2}{3} = .5 = .25, \text{ or } v = \sqrt{.25} = .5.$$

$$v^2 = \frac{13 - 2 \times (-3.5)^2}{3} = -11.5 = -5.75, \text{ or } v = \sqrt{-5.75}$$

Now substitute these values of z and v into the following:

$$x = z + v = 1 + \sqrt{5.5}$$

$$y = z - v = 1 - \sqrt{5.5}$$

$$x = z + v = 2.5 + .5 = 3$$

$$x = z - v = 2.5 - .5 = 2$$

$$x = z + v = -3.5 + \sqrt{-5.75}$$

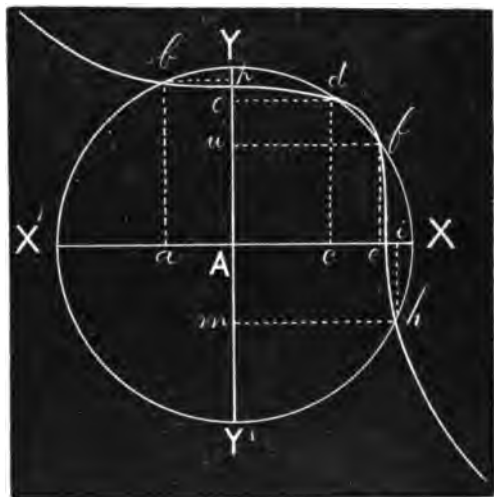
$$x = z - v = -3.5 - \sqrt{-5.75} \quad \text{Let } x \text{ represent each of these}$$

roots and we get $(x - 1 - \sqrt{5.5})(x - 1 + \sqrt{5.5})(x - 3)(x - 2)$

$$(x + 3.5 - \sqrt{-5.75})(x + 3.5 + \sqrt{-5.75}) = 0, \text{ or } x^6 - 19.5x^4 - 35x^3 + 253.5x^2 - 486 = 0$$

The last equation can also be obtained by the following method. From $x^3 + y^3 = 13$, we have $y = \sqrt[3]{13 - x^3}$, and $y^3 = (13 - x^3)\sqrt[3]{13 - x^3}$. Substitute this value of y^3 into $y^3 = 35 - x^3$ and we get $(13 - x^3)\sqrt[3]{13 - x^3} = 35 - x^3$. Squaring each member we have $2197 - 507x^2 + 39x^4 - x^6 = 1225 - 70x^3 + x^6$. Reducing, we get $x^6 - 19.5x^4 - 35x^3 + 253.5x^2 = 486$. This equation also shows, that the number of roots in the first two equations is six; for every equation has as many roots as there are units in the exponent of the highest power of the unknown quantity.

Now let us see how the curves of these two equations intersect each other, and how the roots determine the points.



Let XAX' be the axis of abscissa, and YAY' be the axis of ordinates. Then will $ab = 1 + \sqrt{5.5}$; $cd = 3$; $ef = 2$; $ih = -1 - \sqrt{5.5}$. If we measure from the axis of ordinates, $mh = 1 + \sqrt{5.5}$; $uf = 3$; $od = 2$; $pb = -1 - \sqrt{5.5}$. The distances above the axis of the abscissa are positive, and also those to the right of the axis of ordinates. The distances below the axis of abscissa, and those to the left of the axis of ordinates are negative. Hence $-1 - \sqrt{5.5}$ or ih , and pb are each negative, being equal to $-1.345+$. The two curves intersect each other in b , d , f , and h . The two roots $-3.5 + \sqrt{-5.5}$ and $-3.5 - \sqrt{-5.5}$, being imaginary roots, are indeterminate quantities. They indicate therefore no point of intersection. Hence the two curves intersect each other in four points only.

If the reader is not familiar with the method of finding the locus of each of these two equations, and of tracing the curves he must investigate the subject by studying Analytical Geometry

All these roots verify the first two equations. Therefore

$$x^3 + y^3 = (1 + \sqrt{5.5})^3 + (1 - \sqrt{5.5})^3 = 3^3 + 2^3 = (-3.5 + \sqrt{-5.75})^3 + (-3.5 - \sqrt{-5.75})^3 = 35$$

$$x^2 + y^2 = (1 + \sqrt{5.5})^2 + (1 - \sqrt{5.5})^2 = 3^2 + 2^2 = (-3.5 + \sqrt{-5.75})^2 + (-3.5 - \sqrt{-5.75})^2 = 13$$

ELECTRIC EXPERIMENTS.

J. E. BAKER.

Electroscope—Dutch metal and tissue paper.—"An instrument used to detect the presence of electricity, or to determine its kind, is called an electroscope." Take a *large* glass fruit jar (or wide mouth bottle), and fit in it a stopper of cork or wood. Pass through the center of the cork a copper wire so that the inner end shall be a little above the center of the jar. Bend about three-fourths of the inner end at a right angle. Get from a druggist some Dutch metal and hang a piece, about three-fourths of an inch wide and two or three inches long, on the bent portion of the wire in the jar so that the ends of the Dutch metal will hang down face to face, in contact with each other. It may be fastened to the wire with a little mucilage. If Dutch metal can not be obtained *very fine* tissue paper, arranged in the same way will answer almost as well. It will still be better if the paper be previously soaked in strong salt water and dried. Place on the outer end of the wire a cork or wooden ball (about half an inch in diameter), covered with tin foil. It is now complete. The jar may be warmed to remove moisture from inside, then the stopper may be covered with melted sealing-wax so as to keep the air dry within. Most electroscopes are made of gold leaf but the above is recommended because of its cheapness and durability. The object of suspending the Dutch metal or tissue paper in a jar is to protect it from moisture and air currents. The simplest form of the electroscope is the suspended pith-ball. Bring the rubbed tube near the

ball and the leaves of Dutch metal or tissue paper will instantly diverge, showing the presence of electricity.

Positive and Negative Electricity.—Pith-ball.—Suspend a pith-ball by a fine silk thread. Bring the rubbed tube near it. The rubbed tube attracts and in a moment repels it. Touch the ball with the fingers in order to discharge the electricity it contains. Now rub a shellac or sealing-wax rod with flannel bring it near the ball and the same phenomena of attraction and repulsion will occur. Again bring the rubbed glass near the ball; after contact it is repelled charged with the electricity of the glass; now *immediately* (while the ball is being repelled by the glass) bring the rubbed sealing-wax near it, and it is at once attracted. Do not allow it quite to touch the wax; now every time the glass comes near the ball it will be repelled, and every time the wax is brought near, it will be attracted. From this it is clearly seen that the kind of electricity developed on the glass is different from that developed on the wax. If any other substance be electrified by rubbing it will act either like the glass or like the wax. Authors for convenience have called that kind developed on glass by silk positive electricity; that kind developed on wax with flannel *negative*. A rubber comb can be used instead of the wax by drawing it briskly through the hair.

Positive and Negative—Silk rubber.—While the pith ball is being repelled by the glass if the silk rubber, or handkerchief, be brought near it, the ball will be attracted, showing that the rubber which excites positive electricity on the glass is itself negatively electrified.

Positive and Negative—Electroscope.—Touch the ball of the electroscope with the rubbed tube; the leaves diverge and remain so, charged with positive electricity. Now, while the leaves are thus diverged if any electrified substance be brought near the ball they will diverge still farther if that substance be positively electrified; if negatively electrified the leaves will fall together. Touching the ball either with the rubbed wax or a rubber comb drawn briskly

through the hair they will at once collapse, showing that they are negatively electrified. From the three last experiments is derived the fundamental law of electric action;—"Two bodies charged with like electricities repel each other; two bodies charged with opposite electricities attract each other."

Conduction and Insulation—Electroscope and Leyden Jar.
—Place electroscope on a table. Stick four pieces of sealing-wax on small boards (parts of chalk or cigar boxes) by heating the ends, so that they will stand vertically. Place them on table a few feet from one another and three or four feet from electroscope. Connect first stick with the ball of electroscope by a copper wire. Connect second stick with ball by a lath, third by a hemp twine, and the fourth by a silk cord made by twisting several silk threads together. Bring the rubbed tube near the wire where it is attached to the wax; the leaves of the electroscope *instantly* diverge. Rub the tube again bringing it near the lath; they again diverge. Repeat with the twine; and they will again diverge but not so quickly.

Repeat the experiment with the silk cord; no divergence is seen. Remove the silk cord and wet it thoroughly then replace and with it repeat experiment; The leaves diverge as they did with the wire. Charge the Leyden Jar with Cottrell's Rubber and holding the Jar in one hand touch the knob with a door key held in the other hand; the shock will be the same as if touched with the knuckles. Repeat the experiment using a piece of glass or wood instead of the key; the Jar will be discharged gradually. Repeat again using a piece of gum shellac or sealing-wax; no shock at all will be felt. Continue these experiments with other substances and it will be observed that some materials transmit or conduct electricity more than others, Those that transmit it readily are named *conductors*; as, metals, water.

Those that offer some resistance to its passage are termed *semi-conductors*; as, dry wood, paper, straw, etc. Those that will not transmit electricity at all are called *non-conductors* or *insulators*; as, wax, shellac, silk, some glass, etc.

CONSTELLATIONS OF THE ZODIAC.

D. B. MURPHY.

The ancients in order to distinguish the stars from each other, divided the heavens into Constellations. They supposed each Constellation to occupy a space, which a man, a lion, a ship, &c., would fill if it were there delineated. Hence the different Constellations were represented by animals and objects, which they were supposed to resemble.

The invention of the Constellations of the Zodiac, is attributed to the Chaldeans or the Egyptians; but it is most probable the merit is due the Chaldeans. The first series of Constellations formed appears to have been those of the Zodiac. Finding that the year consisted, neither of 12, nor 13 Lunations, in order to know the exact annual course of the sun, they must observe very strictly the stars that were hid and, that emerged from the sun's rays during the mornings and evenings of, the entire year. Macrobius an ancient Roman writer, and Sextus Empiricus, an ancient Greek writer, have handed down to us the ingenious method by which the ancient Astronomers accomplished this. They determined exactly the course, which the sun describes in the heavens, and divided the year into equal parts, of which the following is a condensed description.

They every day noticed the sun and the whole heavens revolving, from East to West. They also noticed that twelve revolutions of the moon approximated to one of the sun. In the meantime they noticed that the sun with a motion peculiar to itself, receded from day to day from certain stars, and took its place under others always towards the East.

Noticing that there was a sensible difference between twelve revolutions of the moon, and one of the sun, they wished to divide the year into twelve equal parts.

For this purpose they took two brass vessels, the one pierced at the bottom and the other with out any orifice below. Having stopped the hole of the first, they filled it with

water and placed it over the other vessel so the water, would run out into the other vessel the moment the cock was opened. This done they noticed in that part of the heavens where the sun has its annual course, the rising of a star remarkable for its magnitude and at the critical instant when it appeared on the horizon, they began to let the water flow out of the upper vessel during the remainder of that night and next day, till the very moment the same star appeared anew on the horizon. The instant it was again seen they took away the upper vessel and threw out the water that remained in it. The observers were thus sure of having one revolution of the whole heavens, the first appearance of the star and its return. The water that had flown during the revolution of the one star, now afforded them the means of measuring the whole revolution of the starry firmament, and of dividing that duration into several equal parts.

They then divided the water into twelve equal parts, and prepared two other vessels each capable of containing one of these parts and no more.

They poured into the great vessel the twelve parts of water all at one time keeping the vessel shut. They then placed under it one of the two small vessels and the other near it, to succeed it, as soon as the other was full.

The next night they observed that part of the heavens where they had marked the sun's course and waited for the rising of that constellation, which has since been called Aries. The very instant they saw Aries appear, and they saw the first star of it, they let the water flow into the small vessel; as soon as it was full they removed it and threw the water out. In the mean time they put the other vessel under the fall. They observed accurately all the stars that rose during the time the vessel was filling, and that part of the heavens that was terminated by the star which appeared last on the horizon, the moment the vessel was full.

In like manner they proceeded with the vessels alternately till the two small vessels were three times filled, which

marked out six divisions of the heavens, or one half of the course of the sun in the heavens. They were now forced to defer observation, and measurements, until the opposite season of the year, when they proceeded as before.

Having in this manner determined the twelve divisions of the heavens, and marked the cluster of stars peculiar to each, they proceeded to give them names, and in general called them the stations, or the houses of the sun; three of which were assigned to each season.

The particular names given to each of the twelve constellations of the zodiac, are generally supposed to have certain circumstances peculiar to certain seasons. As the Chaldean observers seemed to have been of the opinion that during the spring there were no productions more useful than sheep, cattle, and goats, they gave the three constellations through which the sun passed during that season of the year the names of the three animals, by which they were most enriched. The first was named Aries, or the Ram; the second Taurus, or the Bull; and the third Gemini or the Twins, that is two Goats, which commonly bring forth two young at that season of the year.

The Greeks afterward represented them by Castor and Pollux two twin brothers, sons of Jupiter by Leda the wife of Tyndarus, and as such are represented on our globes.

A WEAK mind is like a microscope, which magnifies trifling things but can not receive great ones.—*Chesterfield.*

I DISCARD as selfish in the extreme, that narrow principle, which would look down upon any branch of human knowledge as useless or important, however widely they may differ in relative value. Some topics of study seem to have no object but the occupation and exercise, whether salutary or not, of the mental faculties; while others do not assert a principle, or move a step without contributing to the welfare and improvement of the human family.—*E. D. Mansfield.*

CORRESPONDENCE.

INTEREST BY VERTICAL LINE CANCELLATION.

Editor Normal Teacher:—I promised to give you an article on Interest by Vertical Line Cancellation. This method must ultimately supersede every other known. It is based on the principle of *cause* and *effect*, as every example in Interest is really one in proportion.

First, let it be understood that Interest is the product of the Principal, by the time in years, and the rate per year.

Take the following example: Interest on \$2000 for 3 yrs. @ 6% per year?

$$\begin{array}{r|l}
 \text{E. x int.} & 2000 \text{ prin.} \\
 & 3 \text{ yrs.} \\
 \text{C. } \left\{ \begin{array}{l} \$1 \text{ prin.} \\ 1 \text{ yr.} \end{array} \right. & \left\{ \begin{array}{l} \$180 \text{ E.} \\ \end{array} \right. \text{C.}
 \end{array}$$

$$\begin{array}{r|l}
 & 2000 \\
 100 & 3 \\
 & 6
 \end{array}$$

| \$360 interest.

Cancellation. 100 on left and 2000 on right leaves on right 20, which multiplied by 3 and 6 gives \$360 Ans.

Take another example: Interest on \$1000 for 8 mos., @ 9% per year?

$$\begin{array}{r|l}
 & 1000 \text{ prin.} \\
 12 & 8 \text{ time in years.} \\
 100 & 9 \text{ rate per year.}
 \end{array}$$

| \$60 Ans.

Having shown in first example that *cause* and *effect* in proportion is the basis of the method I omit the *statement*, in succeeding examples as in practice the above work is sufficient.

Another example: Interest on \$8000 for 20 days at 4% per year?

$$\begin{array}{r|l}
 & 8000 \text{ prin.} \\
 360 & 20 \text{ time in years.} \\
 100 & 4 \text{ rate per year.}
 \end{array}$$

$$\begin{array}{r|l}
 9 & 160 \\
 & \hline
 & \$17\frac{1}{3} \text{ Ans.}
 \end{array}$$

Again: Interest on \$500 for 2 years, 6 mos., @ 1% per mo.?

$$\begin{array}{r|l}
 & 500 \\
 12 & 30 \\
 100 & 1 \\
 & 12 \}
 \end{array}$$

| \$150

This cancels beautifully.

I explain as follows:

The interest on \$1 for 1 yr. is 12 times $\$ \frac{1}{100}$, and for $\frac{1}{10}$ of a year, it will be $\frac{1}{10}$ times $\$ \frac{1}{100}$. If this be the interest on \$1, then on \$500 it will be 500 times as much or \$150.

Again:

Interest on \$3000 for 8 mos. and 20 days @ $1\frac{1}{2}\%$ per mo.?

$$\begin{array}{r|l}
 360 & 3000 \text{ prin.} \\
 2 & 260 \text{ years.} \\
 100 & 3 \left. \vphantom{\begin{array}{l} 3000 \\ 260 \end{array}} \right\} \text{rate per cent.} \\
 & 12 \left. \vphantom{\begin{array}{l} 3000 \\ 260 \end{array}} \right\} \\
 \hline
 & | \$390 \text{ Ans.}
 \end{array}$$

Note the simple way of writing the rate per mo. at $1\frac{1}{2}\% = \frac{3}{2}\%$ per mo.; then for a year it will be 12 times ($\frac{3}{2}$) written as above.

Eight mos. and 20 days = 260 days, or $\frac{260}{360}$ of a year.

Again:

Interest on \$6000 for 1 yr., 8 mos. and 10 days, @ 2% per mo.?

$$\begin{array}{r|l}
 360 & 6000 \\
 100 & 610 \\
 & 2 \left. \vphantom{\begin{array}{l} 6000 \\ 610 \end{array}} \right\} \\
 & 12 \left. \vphantom{\begin{array}{l} 6000 \\ 610 \end{array}} \right\} \\
 \hline
 & | \$244 \text{ Ans.}
 \end{array}$$

The above cancels well leaving the factors 4 and 61 on the left, which multiplied gives answer.

I will now present some anomalous examples to show the simple working of this method in all sorts of examples:

For instance, interest on \$150 for 1 hour at $1\frac{1}{4}\%$ per second?

$$\begin{array}{r|l}
 360 & 150 \\
 24 & 1 \text{ a day.} \\
 & 1 \text{ an hour.} \\
 4 & 5 \left. \vphantom{\begin{array}{l} 150 \\ 1 \text{ a day} \end{array}} \right\} \text{per sec.} \\
 100 & 60 \text{ per min.} \\
 & 60 \text{ per hour.} \\
 & 24 \text{ per day.} \\
 & 360 \text{ per year.} \\
 \hline
 & | \$6750 \text{ Ans.}
 \end{array}$$

Again:

Interest on \$1000000 for a minute at $\frac{3}{4}\%$ per hour?

$$\begin{array}{r|l}
 \left. \begin{array}{l} 360 \\ 24 \\ 60 \end{array} \right\} & 1000000 \\
 & 1 \\
 & 1 \\
 & 1 \\
 & 3 \left. \vphantom{\begin{array}{l} 1000000 \\ 1 \end{array}} \right\} \\
 100 & 24 \\
 & 360 \\
 \hline
 & | \$100 \text{ Ans}
 \end{array}$$

Here we cancel across the line till we have nothing on left, and the factors 5 and 20 on the right which gives \$100.

How quickly and nicely it may be worked by young children even.

Another:

Interest on 1 dime for 25 years @ $1\frac{1}{4}\%$ per mo.?

$$\begin{array}{r|l} 10 & 1 \\ & 25 \\ 4 & 7 \\ 100 & 12 \end{array} \left. \vphantom{\begin{array}{r|l} 10 & 1 \\ & 25 \\ 4 & 7 \\ 100 & 12 \end{array}} \right\}$$

| $1\frac{1}{4}\%$ Ans.

Again:

Interest on $133.33\frac{1}{3}$ for 40 days @ 10% per year?

Here $133.33\frac{1}{3} = 133\frac{1}{3} = 400$.

$$\begin{array}{r|l} 3 & 400 \\ 360 & 40 \\ 100 & 10 \end{array}$$

| $1\frac{1}{3}\% = \$1.47+$

These examples will suffice to indicate to the learner the whole method. It is the most simple and comprehensive method before the public. Children 10 years old can learn it in a day.

I have used it for years and no earthly inducement could return me to the books.

Loyalton, Sierra Co., Cal.

T. H. ROSE.

CRITICISMS.

Editor Normal Teacher:—I would like to notice some things which I came across in looking over my February number of the *TEACHER*.

1. Ex. 6th, Ex. Dep't. My solution:

Int. on \$1 for 92 da. @ $8\frac{1}{4}\% = .0206\frac{1}{4}$

$\$675 \times .0206\frac{1}{4} = \$13.95 = \text{Bank dis.}$

$\$675 - \$13.95 = \$661.05 = \text{Proceeds.}$

Ex. 7th, same place. Time required.

Int. of \$2400 @ 6% for 1 yr. = \$144.

$6 + 144 = \frac{1}{4} = \frac{1}{4}$ yr. = 15 da.

Solution in *TEACHER* gives $15\frac{1}{4}$ days. This is inconsistent with Ex. 6th, where 360 days are calculated to make the interest bearing year and besides the result would then be $15\frac{1}{4}$ instead of the one given.

2. Grammar Q., No. 2, same No. of *TEACHER*, [Vol. II, No. 12].

Perhaps my style of diagram for blackboard work may be new to some teacher, and if you think so please give it room. I will illustrate by a sentence or two. I use indices to indicate class and kind of element, as follows:

I=1st.	{	Class Adj. El.	O	{	1st.
II=2nd.			OO		2nd. Class Obj. El.
III=3rd.			OOO		3rd.
			X=1st.	{	Class Adv. El.
			XX=2nd.		
			XXX=3rd.		

The use of these indices makes any explanation of diagram unnecessary. Underline the words modified and put in parenthesis, elements understood, or attendant els.

[Q. 2, Vol. II, No. 12].

God^s—^pble^ss
^o
^{man}
^I the ^{III} who ^{invented}
^x ^o
^{first sleep.}

[Q. 8, Gram., Vol. II, No. 12].

I think it wrong to state a question for correction that is already correct in the manner used in giving this question. I think it would be much better to make some statement like this: "At the North and South poles the latitude is 90." Correct or not? If not, correct it.

Kipton, O.

E. E. PECK.

SOLUTION OF PROBLEMS.

Editor Normal Teacher.—Mr. J. C. Gregg, Supt. of the Brazil schools, in the February number of Vol. II, proposes three problems (although he says two), for Mr. Reubelt, of Noblesville, Ind., to be solved by him.

I am much more puzzled in trying to satisfy myself *why* he submits the three problems to me for solution more than to any other correspondent of your able journal, than I am in solving the problems themselves. Were I of the opinion that Mr. Gregg thinks it impossible for me to work them, I should never attempt a solution; but as I can not convince myself that such is the case, I shall, instead of solving any one of them, give my solution *in demonstrations* of the second; the first and third are simply worked by obscure formulæ. The second problem is, indeed, an excellent one; its solution embraces principles both of geometry and trigonometry—algebra too, in solving, numerically, the demonstrations of geometry.

I prefix the problem to my solution, or more correctly speaking, with the *demonstration*.

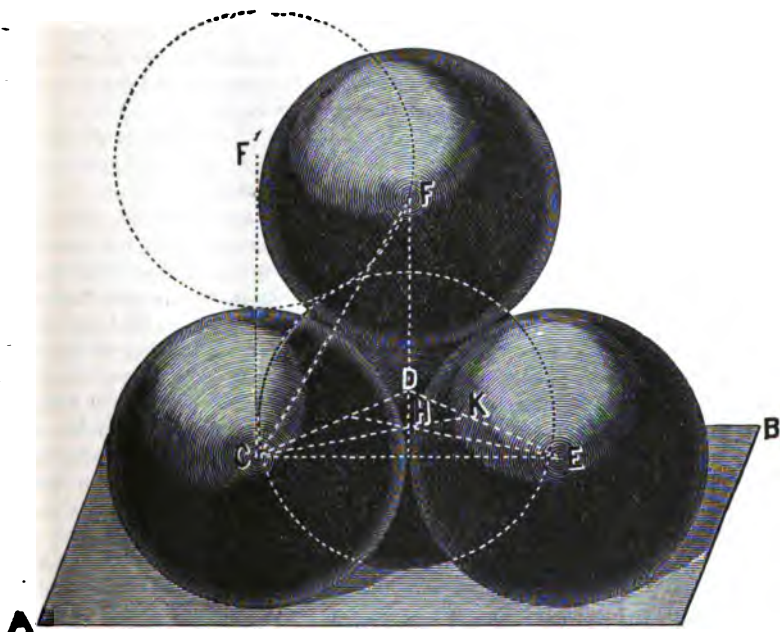
"Four balls, each $3\frac{1}{4}$ in. in diameter are placed in a conical pile, what is the height of the pile, and what is the diameter of a ball that can be enclosed by the four large balls?"

The readers of THE NORMAL TEACHER will at once observe that this problem is the same as the one demonstrated by J. Chas. Stone, of Danville, Ind., in the November No. of Vol. II, with a different answer required.

Allow me, Mr. Gregg, to use the same figure used by J. C. S., in the November number, simply putting the letter R immediately above D where

the circumference cuts the line FD. Although this is not necessary right here. The line CF is $3\frac{1}{2}$, being the sum of two radii, the angle CFD and FCD are each equal to 30° , D is supposed to be in the center of the vacant space, or in the center of the ball. We know those angles to be 30° because in the equilateral triangle CFE, each angle is equal to 60° being $\frac{1}{2}$ of two right angles, and the lines DF and CD bisect the angles at F and at C. Now in the triangle CDF, the side CF is given ($3\frac{1}{2}$), also the angles C and F: adding C and F together and subtracting from 180° will give angle D or 120° .

Now, one side and the angles of an oblique triangle being given the other sides may be found by Case I, in Davies' Legendre in trigonometry. The line let fall from D to the plane upon which three of the balls rest, is equal to $DF + EF - Ea$. This part to be seen in the accompanying figure. Then $2 DF + \frac{1}{4}$ in. the radius of any one of the balls, $+ EF - Ea$ is equal to the height of the pile. First ans.



Demonstration to the second part: These three circles are tangent to each other, and are equal (to each other). Join their centers and there will be an equilateral triangle, each side composed of two radii; each side is therefore $3\frac{1}{2}$ in. The radius of the circle inscribed within the triangle F G H, will be equal to the radius of the small ball enclosed within the larger ones. The line G B bisects the angle A B C, also the line F C bisects

the angle BCA , making the angles BCG and BCF each equal to 30° ; the angle CEB is therefore equal to 120° .

Again by Case I, of Davies' Legendre, in trigonometry, the side CE or EB may be found. CE or its equal EB is the sum of the radius of one of the large circles and the radius of the inscribed circle. CE being found, subtract the radius aB from it and Ea the smaller radius will be left. Double this radius Ea will therefore be the diameter of the smaller ball enclosed within the four large ones.

I trust this will satisfy Mr. Gregg. The other two are not worth one's time to work them. His last sentence "Don't say impossible, for it is not," is impertinent to say the best of it.

F. W. REUBELT.

EDITORIAL NOTES.

As a closing exercise an exposition is by far the most profitable and interesting that the school could possibly offer. It is simply an exhibition of the work done by the pupils during the term. From the first day of school the work has been written out, and preserved with a view to the exposition. In the reading classes, many of the exercises have been preserved; the same in spelling. In arithmetic the problems and solutions, analyses, &c., have been written in a blank book so that each pupil has an arithmetic with the key. In grammar the parsing exercises have all been carefully written and the sentences diagrammed and analyzed. By the way our "Normal Teacher" Parsing Book is just the thing to secure written parsing lessons in good shape for the exposition. In geography each pupil will have his maps and outlines to exhibit. As physiology has been taught by the use of charts and drawings on the blackboard, the teacher can give a very interesting lesson by having pupils step to the charts or diagrams and point out the different parts of the body. History has been taught almost exclusively by essays and outlines and these will be in good order for the exposition. No subject in a country school should receive more careful attention than letter writing. No school is well taught that does not include it in its course of study. This subject should include letters of all kinds, the drawing of drafts, notes, &c., and all these will come in to swell the work of the exposition. Every teacher should be able to teach music. At the exhibition he can exhibit the musical talent of his pupils by having them sing a few songs which they have learned. If rhetoric has been taught there will be a good opportunity to have some original productions read. Every teacher can teach Botany and Geology in a country school, or he *should* be able to do so at least. If he does attempt it, let the pupils collect the rocks and flowers, and the teacher can name and analyze them. Have a nice place where all the rocks and flowers can be on exhibition. The teacher who knows anything of philosophy or chemistry can perform during the term a num-

ber of experiments and teach the pupils to do the same. At the exposition the pupils can perform these experiments themselves. And now when the end of your term is at hand there will be no need of hurrying, cramming, forcing, and neglecting regular work to make some sort of closing display. Yet you will have something interesting and improving to the whole neighborhood which you invite to visit you on the last day. On the afternoon before, you will have the pupils bring in their stores, and with their assistance you will tack some muslin along one side or end of your school-room and under your direction you will all, or such as can be of assistance, fasten in full view the outlines, drawings, the pressed flowers neatly fastened on paper, the pressed ferns and leaves which the children have gathered, and all the various written exercises of both little and big pupils, with the name of the author signed to each, arranging the whole as tastefully as you know how. Have a table, likewise covered with muslin, as the clean background adds much to the appearance of things, on which to arrange such things as can not be hung. Here may be placed the minerals, various kinds of wood, shells, insects, or any specimens or curiosities which the children have gathered and talked about during the term, the copy books, composition books, &c. It is with no little delight that the children see these trophies of their work arranged and spread out before them, surprised to see what a nice display they make. How emulation and ambition are kindled afresh; how it helps them feel special interest in every exercise they prepare during the term; what a *living* interest it gives to the subjects, compared with what a dry, abstract 'examination' would awaken; what growth it promotes in the space of a term through the work it calls forth, compared with any extraneous entertainment such as the 'exhibition' of our country schools, usually is. The idea of the 'Exposition' had its origin in the Normal school, at least we got it there, and having tried it know it to be a most capital one, and wish others to have the benefit of the plans it opens up for raising the plane of school work.

THE question is frequently asked whether our methods and systems of instruction are better than they were in the "good old days of long ago." The question is a serious one and merits an answer. We often hear persons say, "well, I know you have finer and better school-houses, more books and apparatus and you claim to have better teachers than we had in our day, but I don't see that children make much greater improvement now than they made then."

An examination of the methods of instruction practiced fifty and sixty years ago and the advancement in educational progress will show that we have made great improvement. That our methods of teaching are, as a rule, much better—more natural and philosophical, that our teachers are better prepared for their work, and that our children have improved accordingly. In the "good old days" of not more than sixty years ago the "Three R's" and spelling made up the curriculum of our common schools, especially our country schools. Spelling was the principal study. Reading ranked as second in importance and arithmetic was taught as far as the "Double

Rule of Three." If the teacher communicated to his pupils a smattering of these subjects, and kept them in order, he gave satisfaction. And it was usually the case that the "keeping" of the school in order was the test of the teacher's ability. If he was large enough and stout enough and brave enough to lash the big "bullies" of the neighborhood, he was a success. There were but few school books distinctively so called; the children learned many of their lessons in the Bible. In fact, the large majority of pupils had no other reading book than the New Testament or Bunyan's Pilgrim's Progress. Each child generally read by himself. The simultaneous method was little practiced. One after another stepped to the master's desk and recited. He would point out one letter at a time and name it, and the pupil would name it after him. The child was drilled and *drilled* and *DRILLED* in recognizing and remembering characters which to him were worse than meaningless. Children were often, not only terms, but years in learning to read. The work was purely imitative and mechanical on both sides. To understand what was read was seldom thought of. The syllables were pronounced with equal force, and the reading was generally a sing-song style without grace or expression. But space does not permit us to carry the picture further at present. In a future note we shall point out other grave defects and then show wherein the Normal methods of "these latter days" are superior.

IN the January number the following important questions were asked under the head of Questions for Discussion at Township Institutes: Give the nine great principles of Pestalozzi; Elaborate these principles and show how they can be applied in the school-room. As many of our readers have written us asking for these principles we have thought it well to publish them. Pestalozzi developed many principles of teaching which we shall publish from month to month, but the following are those generally known as the Nine Great Principles of Pestalozzi:

1. Activity is a law of childhood: accustom the child *to do*—educate the hand.
2. Cultivate the faculties in their natural order: first form the mind and then furnish it.
3. Begin with the senses, and never tell a child what he can discover for himself.
4. Reduce each subject to its elements: one difficulty at a time is enough for a child.
5. Proceed step by step—be thorough.
6. Let every lesson have a point.
7. Develop the idea, then give the term.
8. Proceed from the known to the unknown.
9. Synthesis, then analysis; not the order of the subject but the order of nature.

Space will not permit of an elaboration of these principles in this paper, but every teacher can elaborate them for himself. They are sufficiently clear to be understood by all.

GRAMMAR DEPARTMENT.

BY F. P. ADAMS.

All the girls were in tears and white muslins, except a select two or three, who were being honored with a private view of the bride and bridesmaids, up stairs.

{	girls	{	All the except [girls]	{	a select two or three who were being honored	{	with view	{	a private of bride the and [of] bridesmaids

There are two or three difficulties in this sentence. First, can *in tears* and *in muslins* be attributes of the sentence. We claim that they can. Many have tried to prove that a *second class* element can not be the attribute of the sentence. A single example will show the fallacy of that proposition.

In the sentence, "he is at liberty to go," *at liberty* is the attribute just as clearly as *free* is in the sentence "he is free to go."

In the sentence under consideration *in tears and white muslins* is predicated of *girls*.

The second point deserving notice is that the article *a* should modify *girls* understood. It in reality modifies *girls* as modified by *select two or three*; or we may say it modifies the complex idea *select two or three girls*.

They marched *Indian file*.

Indian is an adjective, proper, limits *file*.

File is a noun, com., 3d, sing., neut., obj., obj. of the prep. *in* understood.

Have you had your *floor swept*?

Floor is a noun, com., 3d, sing., neut., obj., subj. of the infinitive [*to be*] *swept*.

[*To be*] *swept* is a verb, irreg., trans., pass., infinitive, pres., with the construction of a noun, the object of *have had*.

"*Him*, whose honored name the gentleman himself bears,—does he suppose me less capable, &c."

Him, objective, absolute by pleonasm, used incorrectly for the *nominative*, *he*.

Do you hear the *children weeping*?

Children may be disposed of in either of two ways, (1) as objective by enallage for the possessive children's, limiting the part. *weeping*; or, (2) as objective, subject of the infinitive [*to be*] *weeping*. *Weeping* may be considered as a part., pres., with the construction of a noun, object of *do hear*; or supply *to be* and parse it thus:

[*To be*] *weeping*, verb, irreg., intrans., p. p., weep, wept, wept, act., progressive, infin., pres., with the construction of a noun, the object of *do hear*. The latter view is preferable for both words.

MISCELLANEOUS DEPARTMENT.

INSTRUCTIVE PARAGRAPHS.

- The best philosophy—a contented mind.
- The best statesmanship—self-government.
- The best theology—a pure and beneficent life.
- The best medicine—cheerfulness and temperance.
- The best art—painting a smile upon the brow of childhood.
- No science is speedily learned without tuition.—*Dr. Watts.*
- A brave man is clear in his discourse and keeps close to truth.—*Aristotle.*
- The best science—extracting sunshine from a cloudy way.—*N. E. Jour. Education.*
- Arts that respect the mind were never reputed nobler than those that serve the body.—*Ben Jonson.*
- One may often find as much thought on the reverse of a medal as in a canto of Spencer.—*Addison.*
- He that has no friends and enemies is one of the vulgar, without talent, power, or energy.—*Lavater.*
- A conundrum: If speech is silver, and silence is gold, how much is a deaf and dumb man worth?
- “There are strange footsteps that draw near each of our dwellings; but some of us, when we hear them, go and shut the door.”
- Neither Virgil nor Horace would have gained so great a reputation had they not been the friends and admirers of each other.—*Addison.*

HINTS AND HELPS FOR THE SCHOOL-ROOM.

- There needs to go forth from our public schools a renovating influence upon the race. The teacher should know how to put it forth.—*Rev. J. H. Worcester, D. D.*
- “Nothing more impairs authority than a too frequent, or indiscreet use of it. If thunder itself was to be continual, it would excite no more terror than the noise of a mill.”
- The teacher should directly tell a child nothing which he can be stimulated to find out by his own senses or reflection. A single fact or truth which he himself discovers, is worth a thousand which he passively receives.—*B. G. Northrop, LL. D.*
- Every recitation may be practically a language drill both in terseness and precision. Let every pupil be held accountable for all errors in pronunciation or grammar occurring in the class-room, as if they were his own, unless he notices and corrects them, and let him be encouraged to try, when

confident that he can give any answer in briefer or better terms than his class-mates have done. This method keeps all on the alert, and develops the habit of attention and criticism.—*Id.*

—To make himself thoroughly felt, the teacher must be in the possession of all the powers natural to his office. His mastery of the plan he is to work by, his control of the instruments he is to work with, his direction of courses and methods, ought to be as nearly independent as is consistent with due subordination to a common system.—*Samuel Eliot, LL. D.*

—“None but *experienced* teachers should be employed in our schools.” However absurd and impracticable this observation may seem on the face of it, there is after all underlying it much shrewdness and practical wisdom. It means properly interpreted, that the public schools can not afford to pay for the experiments of beginners in the art of teaching. Thorough scholarship is the first requisite to successful instruction; but where this is already possessed, there may be lacking so much of system and practical ability in the manner of imparting it as to render it worthless.—*King S. Hall, Sec. Bd. of Trust, N. H. Nor. Sch.*

NOTES AND QUERIES.

MATHEMATICS.

1. A borrows a sum of money at 6 per cent., payable semi-annually, and lends it at 12 per cent., payable quarterly, and clears \$2450.85 a year. How much money does he borrow? *CORNELIUS DILLY, Sullivan, Ind.*

2. There is a May pole 90 ft. high, which being broken but not completely severed, by the wind, the top of the pole touches the ground, 30 ft. from the base, what are the lengths of the pieces of the pole?

Solution: The pole, in breaking forms the hypotenuse and perpendicular of a right angled triangle and by the nature of a triangle, the square of the base, 30, is equal to the difference of the squares of the perpendicular and hypotenuse. $30^2 = 900$, the difference of the squares which is also the product of the sum and difference of the two pieces; and this product, 900, divided by the sum 90, gives 10, the difference in the fragments. Adding half the difference, 5, to half the sum, 45, we have 50, the longer fragment, and subtracting 5 we have 40, the shorter. *M. W. W., Coshocton, O.*

3. A house is 40×30 feet and a plank lies diagonally on the floor from corner to corner. The plank has square ends, and 3 ft. wide, its corners to touch an end and a side of the house. How long is the plank?

P. M. McKAY, Coldwater, Miss.

4. Required the longest inflexible rod that can be thrust up a chimney the arch being 4 ft. high and 2 ft. from the arch to the back of the chimney. (The back of the chimney to be straight).

E. ARMACOST, Greenville, Ohio.

5. In the course of a march a general comes to a river which it is necessary he should cross. He has no boats and no appliances to make a correct measurement. How shall he cut timber of an exact length to reach across, taking his measurements on the one side only?

FRANK C. PETERSON, *Dayton, Ohio.*

6. A and B bought a melon for 8 cts., A paying 5 cents and B, 3 cts. C gave them 8 cts. to help eat it. They each ate an equal share. How should the 8 cts. be divided between A and B?

J. A. PADGETT, *New Bloomfield, Mo.*

7. A flag staff is 120 ft. high and $2\frac{1}{2}$ inches in circumference. How many feet of twine will it require to wind spirally around it from the bottom to the top, passing once around it every 3 ft.?

Z. B. WEST, *Fairfield, Ill.*

8. Where shall a board, 12 ft. in length, 4 inches at one end and 12 inches at the other be cut in order that each end will contain the same area.

GRANT GREGG, *Rushville, Ind.*

GRAMMAR.

1. Analyze and parse italicized words:

It took Rome three hundred years to die. R. ALBERT, *Greencastle, Ind.*

2. Diagram and state the kind of element as regards structure, relation, and base, expressed by the italicized words:

Much depends on who the commissioners were.

LEWIS T. MEREDITH, *Alexandria, Ind.*

3. Analyze: I want to be quiet and to be let alone.

ROBERT GILMORE, *Sparta, Ind.*

MISCELLANEOUS.

1. Who was Southey? Name some of his works. State the place and time of his birth and death.

2. What is the office of a "Poet Laureate?" Who is now "Poet Laureate?"

E. P. CLEMENS, *Darke, Ohio.*

ANSWERS.

1. [Vol. II, No. 11, Q. 1, p. 368.]

One number divided by another gives a quotient 10.24; the product of the two is 6400. What are the numbers?

Ans. If the product of the two numbers = 6400 and the quotient of the greater divided by the less is 10.24, then the greater must be 10.24 times greater than the smaller, and their product 10.24 times greater than the square of the smaller number. Hence $6400 \div 10.24 = 625 =$ the square of the smaller number. $\sqrt{625} = 25 =$ smaller number. $25 \times 10.24 = 256$ the larger number.

S. A. KAGY, *Findlay, Ohio.*

2. [Vol. II, No. 10, Q. 15, p. 328.]

Three women own a ball of yarn 4 inches in diameter. How much of the diameter of the ball must each unwind so that they will share equally?

Ans. It is a known principle that spheres are to each other as the cubes of their diameters; hence $4^3=64$; $\frac{2}{3}$ of 64=42.666666+; $\sqrt[3]{42.666666+}=3.602+$; $4000-3.602+=398+$, first woman's share. $\frac{1}{3}$ of 64=21.333333+; $\sqrt[3]{21.333333+}=2.371$, third woman's share. $2.371+397=2.768=1.231$, second woman's share. E. M.

3. [Vol. II, No. 10, Q. 13, p. 327.]

A vessel sails 8 miles an hour in still water; going up stream it requires 72 minutes to sail 8 miles. How long will it require going down stream?

Ans. In still water, the vessel would sail $\frac{2}{3}$ or $\frac{4}{6}$ of 8 miles=9 miles in 72 min. $9\frac{1}{2}-8=1\frac{1}{2}$ distance the current carries it back in 72 min. $\frac{4}{6}$ of $1\frac{1}{2}$ miles= $1\frac{1}{2}$ miles, velocity of current per hour. $8+1\frac{1}{2}=9\frac{1}{2}$, distance it sails down stream in an hour. $9\frac{1}{2} : 8 :: 60 \text{ min.} : 51 \text{ min. } 28\frac{1}{2} \text{ sec.}$, time required to sail 8 miles down stream

CORNELIUS DILLY, *Sullivan, Ind.*

4. [Vol. II, No. 12, Q. 2, p. 414]

What must gold sell for that an investment in 5-20's at 120, may yield 8 per cent. interest on the income?

Let 100%=par value of bonds.

(1) 6%=income on bonds paid in gold.

(2) 120%=current value of bonds.

(1) 6% of 100 per cent.=6 per cent. income paid in gold.

(2) 6%=? per cent. of 120 per cent. capital invested.

(3) $1\frac{1}{2}\% = \frac{1}{10}$ of 120%.

(4) $6\% = 6 \times \frac{1}{10} = \frac{6}{10} = 60\%$, rate of income capital.

6 per cent. of 100 per cent. (par value of bonds)=5 per cent. of 120 per cent. (amt. invested). Then gold must be at a premium, so as to increase the rate of income on investment from 5 per cent. to 8 per cent. which is 3 per cent.

(1) 3 per cent. of 120 per cent.=3.6 per cent.

(2) 3.6 per cent.=? per cent. of 6 per cent. (income in gold).

(3) 1 per cent.= $\frac{1}{4}$ of 6 per cent.

(4) 3.6 per cent.= $3.6 \div \frac{1}{4} = 14.4 = 144\%$ per cent.

Therefore gold must be at a premium of 60 per cent. or be quoted at 160.

C. H. ALLEN, *Winchester, Ind.*

5. [Vol. II, No. 12, Q. 1, p. 414.]

At what times between 4 and 5 o'clock is the minute hand as far from 8 as the hour hand is from 3?

Ans. If the hour hand did not move the minute hand would have to move over 35 min.; but the hour hand moves a certain distance; therefore the minute hand must move over 35 minutes, minus that distance.

12 distances=35 min.-1 distance.

13 " =35 "

1 " = $\frac{1}{12}$ "

12 " = $32\frac{1}{12}$ " —time after 4 o'clock.

Second Solution:

12 distances=45 min.+1 distance.

11 " =45 "

1 " =44 "

12 " =49 $\frac{1}{11}$ " =time after 4 o'clock.

M. DADDY HAGUE.

6. [Vol. II, No. 12, Q. 4, p. 414.]

The time past noon+3 hr. is equal to $\frac{1}{2}$ the time to midnight. What is the hour?

Ans. Let x =the hour.

Then $x+3 = \frac{12-x}{2}$. Clearing of fractions, $2x+6=12-x$. Transposing and collecting, $3x=6$. $\therefore x=2$.

2 o'clock+3 hr.=5 hr. 12 o'clock (midnight)-2 hr.=10 hr. 10 hr.+2 =5 hr. Id.

7. [Vol. II, No. 11, Q. 6, p. 368.]

How far is it from one side of the lower corners of a cubical box measuring 6 ft. on each side, to the opposite upper corner?

Ans. The square of one side of the base plus the square of an adjoining side will give the square of the diagonal of base; the square of this diagonal plus the square of altitude will give the square of the diagonal from one lower corner to its opposite upper corner. In short, $\sqrt{6^2+6^2+6^2} = \sqrt{36+36+36} = \sqrt{108} = 6\sqrt{3} = 10.393 + \text{ft.} = \text{distance.}$

M. A. GRUBER, Leesport, Pa.

8. [Vol. II, No. 11, Q. 10, p. 368.]

Suppose we had but the Roman characters, how could we express in those characters the following amounts 10, 186, 564, 427; $\frac{1}{10}$; $\frac{1}{11}$; $363\frac{1}{4}$? A bar or dash over a letter increases its value a thousand fold.

10, 186, 564, 427,= $\overline{\text{X}}$ CLXXXVI DLXIV CDXXVII.

$\frac{1}{10} = \frac{\text{IX}}{\overline{\text{X}}}$. $\frac{1}{11} = \frac{\text{XLV}}{\overline{\text{XXIII}}}$.

$363\frac{1}{4} = \text{CCCLXIII} \frac{\text{I}}{\text{IV}}.$

Z. T. TURNER, Eleroy, Ill.

9. [Vol. II, No. 10, Q. 17, p. 328.]

If A and B together can do a piece of work in 20 days, and A can do the same work 10 days sooner than B; how long will it take B to complete the work after A and B have worked 15 days?

Ans. Let x =A's time to perform the whole work, and y =B's time; then $\frac{xy}{x+y} = 20$; also $y-x=10$. From these equations we find $x=35.6155+$ days, and $y=45.6155$ days. As A and B can do the work in 20 days, they can do $\frac{3}{4}$ of it in 15 days, leaving $\frac{1}{4}$ to be completed by B; and as B can do the work in 45.6155 days, he can do $\frac{1}{4}$ of it in 11.4+ days.

J. W. JONES, Circleville, Ohio.

NOTES.

A CRITICISM.

[Vol. II, No. 11, Q. 10, p. 375, Ex. Department.]

I consider that two other events, each of as deep, and, perhaps, of more interest than the event given in answer to the question, should have been added to the answer, viz.: The battle of Lexington, the first battle of the Revolution, fought April 19, 1775 and the Proclamation of Peace to the American Army after the Revolution, April 19, 1783.

M. A. GRUBER, *Leesport, Pa.*

If L. B. Fraker will send me problems 6 and 20 in Sept. number, 1879, I will try them a hitch for his benefit.

J. C. GREGG, *Brazil, Ind.*

In Ridpath's history, page 280, we read that the first dispatch ever sent over a wire was the news that Mr. Polk was nominated for President at Baltimore in 1844, sent from Baltimore to Washington, D. C.

In a work entitled "Our First Century," by Judge Devens (good authority), page 350, we read that the first dispatch ever so transmitted was sent by a young lady and read "What hath God wrought." Who is correct?

N. JAY LA ROSE, *Logansport, Ind.*

On page 330 Vol. II, No. 10, I find given $\sqrt{x} + \sqrt{ax} = a - 1$, in which the value of x is required.

In the solution as published, there seems to me, to be some errors, and if you will pardon the liberty I take, I will give the solution as I suppose it was intended.

$$(1) \sqrt{x} + \sqrt{ax} = a - 1.$$

$$(2) x + 2x\sqrt{a} + ax = (a - 1)^2 \text{ by squaring (1).}$$

$$(3) x(\sqrt{a} + 1)^2 = (\sqrt{a} + 1)^2 (\sqrt{a} - 1)^2 \text{ by factoring (2).}$$

$$(4) x = (\sqrt{a} - 1)^2, \text{ by dividing by common factor.}$$

B. B. LAKIN, *Streator, Ill.*

[The above is correct. There was a misprint in the solution.—ED.]

CRITICISMS ON ANSWERS.

Nos. 8, 7, and 9 in the November number of THE NORMAL TEACHER. (Answer No. 7).

They told us *where* we could buy a morning paper.

Diagram. $\left\{ \begin{array}{l} \text{They} \\ \text{told} \end{array} \right\} \left\{ \begin{array}{l} [\text{to}] \text{ us} \\ \left[\begin{array}{l} \text{we} \\ \text{could buy} \end{array} \right\} \left\{ \begin{array}{l} \text{paper} \\ \text{where} \end{array} \right\} \left\{ \begin{array}{l} \text{a} \\ \text{morning} \end{array} \right\} \end{array} \right.$

(1). In the parsing of the italicized word "*where*," Mr. L. D. D., says it is a conjunctive adverb, introducing the subordinate sentence and modifying the predicate of the principal sentence. A conjunctive adverb introduces a subordinate sentence and modifies its verb. The whole subordinate clause modifies the verb in the principal, but the connecting adverb always modifies the verb in the subordinate sentence.

(2). In the 8th and 9th answers, on the same page, he makes similar errors with the words "*where*," and "*when*."

A. G. SWEAZEY, *Bear Branch, Ind.*

✓ EXAMINATION DEPARTMENT.

QUESTIONS PREPARED BY THE INDIANA STATE BOARD OF EDUCATION, FOR THE EXAMINATION OF TEACHERS IN FEBRUARY, 1880.

WRITING.

1. What do you understand by base line? What by head line? 2 pts., 5 each.
2. How does the first line in small a differ from an ordinary left curve or third principle? How high is d? 2 pts., 5 each.
3. Write all the capitals in which the inverted oval is found? 10.
4. How far below the base line does the letter g extend? What other letters extend below to the same distance? 2 pts., 5 each.
5. Why is it valuable for the pupil to analyze the letters in his copy? 10.

Let the penmanship of the candidate as shown in the answers to the above questions be marked from 1 to 50 according to the judgment of the Superintendent.

ORTHOGRAPHY.

1. Into what two classes may letters be divided? State the basis of the division. 2 pts., 5 each.
2. Divide the following words into syllables so as to show their proper pronunciation:—*armistice; baronet; convoke; sirup; piquant.* 5 pts., 2 ea.
3. (a) How many sounds may the letter a be used to represent? (b) Write a word to illustrate each. 2 pts., 5 each.
4. (a) Add the suffix *ing* to the following words, and (b) state the rule for spelling that applies:—*plan, begin, infer, sit, beat.* 2 pts., 5 each.
5. What is the meaning of the following abbreviations:—*acct., cf., atty., C. O. D., I. H. S.?* 5 pts., 2 each.
6. Spell correctly the following words:—*acquiting, potatos, attornies, tongue, pretty, courtesy, cantos, frolick, azure.* 10 pts., 5 each.

READING.

"I had a dream which was not all a dream;
The bright sun was extinguished and the stars
Did wander darkling in the eternal space,
Rayless and pathless, and the icy earth
Swung blind and blackening in the moonless air."

From "Darkness."

1. (a) Who was the author of this poem? (b) When and where did he live? (c) Name two other poems he has written. a=4; b=3; c=3.
2. Point out the emphatic words in the above and tell why they are emphatic. 10.
3. Which of these words can be emphasized by prolonging the vowel sound? Which by speaking the word with more force? 10.
4. Designate the poetical feet in the third and fourth lines. 10.
5. Indicate the elementary sounds in the following words, using the proper diacritical marks:—*stars; eternal; past; passions; blackening.* 5 pts., 2 each.

Let the candidate read a selection at sight, upon which he shall be marked according to the judgment of the Superintendent, from 1 to 50.

ARITHMETIC.

1. Define analysis. Define a rule, as used in Arithmetic. 2 pts., 5 ea.
2. Define a perpendicular. Define a rectangle. 2 pts., 5 each.
3. How many yards of cloth $\frac{3}{4}$ yd. wide, will line $25\frac{1}{2}$ yd. $1\frac{1}{2}$ yd. wide?
Proc. 5; ans. 5.
4. St. Petersburg is 30° , $2'$ East Long., and Indianapolis 86° , $10'$ West Long. When it is 8 A. M. at St. Petersburg, on Wednesday, what is the time at Indianapolis?
Proc. 5; ans. 5.
5. A merchant sold a lace collar for $\$1\frac{1}{8}$ that had cost him $\$1\frac{1}{10}$. What per cent. profit did he make?
Proc. 5; ans. 5.
6. Reduce 1 pk., 64 pts., to the decimal of a bushel? Proc. 5; ans. 5.
7. If wheat yields 72 per cent. of its weight in flour, how many barrels of flour can be made from 260 bushels of wheat?
Proc. 5; ans. 5.
8. What is the interest of \$542, for 3 mo., 15 da., at $6\frac{1}{2}\%$ per annum?
Proc. 5; ans. 5.
9. Reduce 492 dekagrams to quintals. By analysis. Anal. 5; ans. 5.
10. How many bricks each 8 in. long, 4 in. wide, and $2\frac{1}{4}$ in. thick, will be required for a wall 120 ft. long, 8 ft. high, and 1 ft., 6 in. thick, no allowance being made for mortar?
Proc. 5; ans. 5.

GRAMMAR.

1. Correct,—“He is the most remarkable man whom the present age has produced,” and parse the word connecting the two clauses. 2 pts., 5 ea.
2. What is the rule for the agreement of pronouns with antecedents of different persons?
10.
3. Correct,—“Me being present, they were embarrassed,” and parse the first pronoun. 2 pts., 5 each.
4. Write a sentence containing two commas, and give the rules for their use. 2 pts., 5 each.
5. Analyze,—Daniel Boone, the pioneer of Kentucky, was born in Bucks County, Penn. 10.
6. “Let every one attend to his lessons,”—parse *every* and *one*.
2 pts., 5 each.
7. Conjugate the verb *see* in the present, potential, passive. 10.
8. What is an *abstract* noun? A *verbal* noun? 2 pts., 5 each.
9. Write a sentence in which an infinitive is used as a noun in the objective case and parse the infinitive. 2 pts., 5 each.
10. What are pronominal adjectives? 10.

GEOGRAPHY.

1. Give three proofs that the earth is round. 3 pts., 4 off for each om.
2. Give three proofs of the interior heat of the earth.
3 pts., 4 off for each om.
3. What are continental islands? What other class of islands is there?
2 pts., 5 each.

4. Name the five oceans in the order of their size. 5 pts., 2 each.
5. What empire is on the western hemisphere? What important republic, on the eastern? 2 pts., 5 each.
6. A vessel lands at New York laden with cotton, sugar and rice; from what port did she probably sail? Give reason for your answer. 2 pts., 5 each.
7. Name the states that constitute New England. By what other names are four of them frequently called? 5 pts., 2 each.
8. In what part of the United States are manufactures chiefly carried on? Why? 2 pts., 5 each.
9. What country lies in the northern part of Asia? To what nation does it belong? 2 pts., 5 each.
10. Fill the following blanks: 10 pts., 1 each.

Country.	Government.	Ruler.	Capital.	Largest City.	Exports.
Austria.					
Italy.					

HISTORY.

1. Name the principal tribes of N. A. Indians, in the colonial period. 5 pts., 5 each.
2. What part of what is now the United States was explored by Hernando Cortes? 10.
3. Who was Sir Martin Frobisher? 10.
4. (a) Where and (b) by whom were settlements first made in New York? 2 pts., 5 each.
5. Why were the Quakers persecuted? 10.
6. (a) By whom was Louisiana settled, and (b) how did it pass to the United States? a=2; b=8.
7. (a) What was the Stamp Act, 1765, and (b) where was it first formally resisted? a=7; b=3.
8. Describe the battle of Bunker Hill. 10.
9. Name three leaders of the Federalist party, 1789. 10.
10. What led to the Capture of Washington, 1814? 10.

NOTE.—Narratives and descriptions should not in any case exceed six lines.

PHYSIOLOGY.

1. How many bones are in the wrist and hand? What is a peculiarity of the human hand? 2 pts., 5 each.
2. Why should the brain be protected by a solid bony covering, and the heart, lungs, and stomach be so largely protected by muscles only? 10.
3. Name three uses of the bones. 3 pts., 4 off for each om.
4. Why do muscles need both rest and exercise? 2 pts., 5 each.
5. Why is warm moist air more oppressive than warm dry air? 10.
6. Why is it healthier to breathe through the nose than through the mouth? 10.
7. Why are the veins pulseless? How does muscular action promote

- the venous circulation? 2 pts., 5 each.
8. Where is chyle formed? How? 2 pts., 5 each.
9. What are the functions of the two classes of spinal nerves? 2 pts., 5 each.
10. What is the office of the thoracic duct? Into what does it discharge its contents? 2 pts., 5 each.

THEORY AND PRACTICE.

1. What attention should the teacher give to the manners of his pupils? 20.
2. What relation does the instruction of a school sustain to its discipline? 20.
3. Should rules be enacted before the conduct of pupils makes such rules necessary? Give reason for answer. 2 pts., 10 each.
4. Why should a teacher not impose extra study as a punishment for misconduct? 20.
5. What are the chief difficulties that beset a teacher in the management of a country school? Give four. 4 pts., 5 each.

ANSWERS TO STATE BOARD QUESTIONS, FOR FEBRUARY, 1880.

IN SPECIAL CHARGE OF ANNIE M. SHERRILL.

The Number of the Answer Corresponds to the Number of the Question.

ORTHOGRAPHY.

1. Vowels and consonants. The division is based on the difference of position of the vocal organs in pronouncing them, the vowel requiring a more open position than the consonant.
2. Ar'-mis-tice; con-voke'; sir'-up; piqu'-ant.
3. (a) Six. (b) ate, at, air, arm, ask, all.
4. (a) Planning, beginning, inferring, sitting, beating. (b) Words which end with a single consonant preceded by a single vowel, and which are accented on the last syllable, double the final letter on taking an additional syllable beginning with a vowel. Words which end with a consonant, preceded by a diphthong or digraph do not double the final letter on taking an additional syllable.
5. Account; (confers) compare; attorney; collect on delivery; *Jesus Hominum Salvator*; Jesus the Savior of men.
6. Acquitting; potatoes; attornies; melon; tongue; pretty; courtesy; cantos; frolic; azure.

READING.

1. (a) Byron. (b) From 1788, to 1824, in England. (c) Prisoner of Chilon. The Bride of Abydos.
2. Dream, all, extinguished, rayless and pathless, blind and blackening; because they are the words to which it is desired to call special attention as

being descriptive of strange and wonderful conditions of common things

3. In verse written in iambic pentameter the emphasis is made rather by prolonging the vowel than by speaking the syllable with more force.

4. Third line contains four iambic feet and one anapest and in the fourth line the first foot is trochaic and the remaining four iambic.

ARITHMETIC.

1. Analysis. The resolving of problems by reducing them to equations.
—*Webster*. A prescribed method of procedure for performing operations and reaching certain results.

2. A perpendicular is a line at right angles to the plane of the horizon. A rectangle is a figure having four sides and four right angles.

$$3. \frac{2}{3} : 1\frac{1}{2} :: 25\frac{1}{2} \text{ yd.} : ()$$

$$\frac{2}{3} \times \frac{3}{2} \times 1\frac{1}{2} \text{ yd.} = 37\frac{1}{2} \text{ yds.}$$

$$4. \begin{array}{r} 30^{\circ} \quad 2' \\ 86 \quad 10' \end{array} \quad 8 \text{ hr.}$$

$$\begin{array}{r} 15 \overline{) 116 \quad 12'} = \text{dif. of long.} \quad \begin{array}{r} 7 \quad 44 \text{ min.} \quad 48 \text{ sec.} \\ 15 \quad 12 \end{array} \end{array}$$

$$7 \text{ hr. } 44 \text{ min. } 48 \text{ sec.} = \text{dif. of time.}$$

Indianapolis being farther west has earlier time which makes its time 7 hr., 44 min., 48 sec. earlier in the day; viz: 15 min., 12 sec. A. M.

$$5. \$1\frac{1}{2} - \$\frac{1}{2} = \$1$$

$$\text{Let } 100\% = \$1$$

Then $\$1$ are as many % of $\$1\frac{1}{2}$, as 1% of $\frac{1}{2}$ is contained times in $\frac{1}{2}$.

$$1\% \text{ of } \frac{1}{2} = \frac{1}{200}$$

$$\frac{1}{2} \times \frac{200}{1} = 100 = 44\frac{1}{2}\%$$

Therefore he gained $44\frac{1}{2}\%$.

$$6. 1 \text{ pk. } 64 \text{ pt.} = \frac{3}{4} \text{ bu.} = 1.25 \text{ bu.}$$

$$7. 260 \times 60 = 15600 = \text{no. lbs in } 260 \text{ bu.}$$

$$72\% \text{ of } 15600 \text{ lbs} = 11232 \text{ lbs.}$$

$$11232 + 196 = \text{no. bls. in } 11232 \text{ lbs.}$$

$$8. 6\frac{1}{2}\% \text{ of } \$542 = \$34.32\frac{1}{2} \text{ int. for } 1 \text{ yr.}$$

$$\frac{1}{3} \text{ of } \$34.32\frac{1}{2} = \$8.58\frac{1}{3} = \text{int. for } 3 \text{ mos.}$$

$$\frac{1}{4} \text{ of } \$8.58\frac{1}{3} = \$1.43\frac{1}{8} = \text{int. for } 15 \text{ da.}$$

$$\$10.01\frac{7}{8} = \text{int. for entire time.}$$

$$9. 1 \text{ dekagram} = 10 \text{ grains.}$$

$$492 \quad \quad = 4920 \text{ grains.}$$

$$1 \text{ quintal} = 100000 \text{ grains.}$$

In 4920 grains there are as many quintals as 100000 is contained times in 4920, which is $\frac{1}{20000}$. Therefore; 492 dekagrams = $\frac{1}{20000}$ of a quintal.

$$10. 8 \text{ in} \times 4 \times 2\frac{1}{4} = 72 \text{ cu. in.} = 1\frac{1}{8} \text{ cu. ft.}$$

$$120 \text{ ft.} \times 8 \times 1\frac{1}{2} = 1440 \text{ cu. ft.}$$

$$1440 \text{ cu. ft.} \div 1\frac{1}{8} = 34560 = \text{no. bricks required.}$$

GRAMMAR.

1. After an adjective in the superlative degree *that* should be used instead of *whom*. *That* pro., rel. antecedent man with which it agrees in 3d., sing., mas. obj. case, object of produced.

2. When a pronoun stands for two or more words, connected by *and*, but of different persons the pronoun agrees with the first person rather than the second, and with the second rather than the third. Thus, William and I had *our* skates with *us*. One of these subjects, William, being in the third person, and the other, I, being in the first person, the pronoun *We* would not express the meaning if we were to say William and I had *their* skates with *them*.—*Hart's Gram.*, p. 128.

3. *I* being present, they were embarrassed. *I* is a pronoun, personal, agrees with antecedent, the name of person speaking, in 1st., sing., gender unknown, nom. absolute with the participle *being*.

4. Mr. Smith, the merchant, went to the city, but not to remain long. Rules: Appositive phrases should be separated from the context by commas. The members of a compound sentence, when short and connected by conjunctions should be separated by commas.

5. Daniel Boone, the pioneer of Kentucky, was born in Bucks Co., Penn., is a simple declarative sentence of which Daniel Boone, the pioneer of Ky., is the complex sub., of which Daniel Boone is the simple subject modified by 'the pioneer of Ky.,' a complex adj. element of the first class, of which 'pioneer,' the base, is modified by 'the,' a simple adj. element of the first class, and by 'of Ky.,' a simple adj. element of the second class. 'Was born in Bucks county, Penn.,' is the complex pred. of which 'was born' is the simple pred., modified by in Bucks Co., Penn., a complex adverbial element of the second class of which 'Bucks Co., the noun of the case is modified by [in] Penn., a simple adj. element of the second class.

6. *Every*, an adj., pronominal limits 'one.' One is a pronominal adj. used to represent a noun in the 3d., sing., mas., and is the objective subject of the infinitive [to] attend.

7. I may, can or must be seen; you may, can or must be seen; he may, can or must be seen. Plu., We may, can or must be seen, you or ye may, can or must be seen, they may, can or must be seen.

8. An abstract noun is the name of some quality. A verbal noun is the name of an action or state of being.

9. I desire *to do* right. To do, verb irreg., trans., active, infin. mode cons. of noun, obj. of desire.

10. Pronominal adjectives are such as may, without an article represent a noun.

GEOGRAPHY.

1. (a) Men have sailed in the same general direction and reached again the same point from which they started. (b) The shadow of the earth on the moon during an eclipse is always circular and none but spherical bodies can cast circular shadows in any position they may be placed. (c) If a vessel at sea approach the shore the top of the masts are first seen and lastly the hull. If the earth were a flat surface the lower parts would appear as soon as the upper.

2. (a) Warm springs. (b) Volcanoes. (c) Observations in deep mines

and Artesian wells show an increase in temperature of about 1 degree Fahrenheit for every 55 ft. in depth.

3. Continental islands are those situated in the immediate vicinity of continents and form properly a part of the continental structure. Oceanic islands lie at a distance from the continents, in the midst of the oceanic basins.—*Guyot*.

4. Pacific, Atlantic, Indian, Antarctic, Arctic.

5. The Empire of Brazil. France.

6. From New Orleans because it is the greatest shipping point for these articles, Louisiana producing in addition to great crops of rice and cotton, $\frac{9}{10}$ of all the sugar raised in the U. S.

7. Maine, New Hampshire, (Granite State) Vermont, (Green Mountain State) Connecticut (Blue Law State) Massachusetts and Rhode Island, (Little Rhody).

8. In the New England and Middle States, because (1) they are older, (2) they have minerals, such as coal and iron; (3) they have ample water power, and (4) they are not so well adapted to agriculture.

9. Siberia. It belongs to Russia.

10. Austria is a constitutional monarchy, under Francis Joseph, Vienna is the capital and largest city, the exports are wheat, wine, salt, wool and manufactured articles.

Italy is a constitutional monarchy, ruler, Humbert, Rome is the capital and largest city, the exports are olive oil, fruits, sulphur and manufactures of silk, linen and straw.

HISTORY.

1. The Seminoles, the Mohegans, the Powhatans, the Pequots, the Andastes.

2. California.

3. Martin Frobisher was a bold and skillful sailor who in 1578 attempted to reach the Indies by sailing around America to the north. He attained a higher latitude than had ever before been reached on the American coast. He discovered the group of islands lying in the mouth of Hudson's strait. In latitude 63° he entered the strait which has since borne his name. South of this strait he discovered an island which he named *Meta Incognita* and supposed it to be a part of Asia. His fleet was fitted out and furnished by Lord Dudley, Earl of Warwick.

4. In 1613 a Dutch colony under the patronage of the West India Company, settled at New Amsterdam, afterward called New York, and also at Fort Orange, (Albany).—*Henry's School Hist. U. S.*

5. It could not be expected that an American colony, founded by exiles, pursued with malice and beset with dangers, should be wholly exempt from the shame of evil deeds. The Puritans established a religion rather than a civil common wealth: whatever put the faith of the people in peril seemed to them more to be dreaded than pestilence or death. To ward off heresy, even by destroying the heretic, seemed only a natural self-defense.—*Ridpath*.

6. Louisiana was settled by the French, at Iberville, 1699. It was purchased from France by the U. S., in 1803, during the administration of Jefferson.

7. In 1765 the British Parliament passed an act providing that all notes and legal documents and all newspapers, pamphlets, &c., executed or printed in the Colonies should be upon stamped paper provided by the English Government and for which a certain price must be paid. It was first formally resisted by the Virginia House of Burgesses. The resolutions denouncing the act were drawn up by Patrick Henry. It was on this occasion that he made his memorable speech in which he used the expression "Caesar had his Brutus, &c."

8. At three o'clock in the afternoon of June 17th, 3000 picked British troops crossed the harbor, and, after landing, began to ascend the hill. The Americans waited until the enemy were within 150 yards and then poured on them a destructive fire. The British staggered, then broke, and retreated in dismay. A second attempt ended the same way. The third time the British were re-enforced. The patriots' ammunition was exhausted, and the British, taking advantage of this, pushed forward, sprang over the earthworks and the hill was gained. It was a dearly won British victory, for it cost them over 1000 in killed and wounded. The American loss was about 450; but among these was the active patriot, Dr. Warren.—*Harper's School History, U. S.*

9. Hamilton, Madison and Jay.

10. Late in the summer Admiral Cochrane arrived off the coast of Virginia with an armament of 21 vessels. Gen. Ross with an army of 4000 men, freed from service in Europe came with the fleet. The American squadron, commanded by Commodore Barney, was unable to oppose so powerful a force. The enemy's flotilla entered the Chesapeake with the purpose of attacking Washington and Baltimore. The larger division of the British fleet sailed in to the Patuxent, and on the 19th of August the forces of General Ross were landed at the town of Benedict. Commodore Barney was obliged to blow up his vessels and take to the shore. From Benedict the British advanced against Washington.—*Ridpath.*

PHYSIOLOGY.

1. The wrist has 8 bones, the hand 19. One peculiarity of the hand is the power of opposing the thumb to either of the fingers so that small objects can be picked up and handled.

2. Blows which would not materially injure the stomach, the lungs or heart would seriously injure the brain, hence the need of a more solid protection.

3. To form a framework for the body, for the attachment of muscles and for the protection of the vital organs.

4. Muscles need rest to regain the matter which is wasted or used up by exercise. We need exercise to keep the blood circulating in them and develop them to a normal growth.

5. When air is excessively warm and moist it is lighter and contains

less oxygen, consequently the lungs do not get their requisite supply. Very warm dry air is irritating to the lungs. A certain amount of moisture in the air is conducive to health and comfort.

6. The temperature of the air is modified by passing through the nose, also particles of dust are arrested and prevented from entering the lungs.

7. The blood flows steadily through the veins because not impelled like that in the arteries by the contractions of the heart. The veins are provided with valves which permit the passage of the blood in but one direction. Muscular action by pressing upon the veins causes the blood to move in them and the valves cause it to move in but one direction and thus the circulation is promoted.

8. Chyle is formed in the duodenum and small intestines by the action of the bile and pancreatic juice upon the chyme.

9. Sensation and motion.

10. The thoracic duct receives the chyle from the lymphatic vessels and glands and empties it into the subclavian vein.

THEORY AND PRACTICE.

1. The teacher should give due attention to the manners of his pupils, kindly reminding them of violations in this respect and teaching it incidentally both by precept and example.

2. If a school is properly instructed the discipline will be an easy task. Discipline should as far as possible be taught rather than enforced.

3. If rules are necessary at all, they should never be enacted before the conduct of pupils makes such rules necessary, for the reason that to anticipate an evil by making a law against it often prompts to its commission. The pupil may never have thought of committing a breach of order until his attention was called to it by the rule. Besides there is a principle in human nature which prompts us to resist any arbitrary restraints imposed upon us. Especially is this principle well developed among American people.

4. Study should be made a delight and not a task. Study under such circumstances would tend to disgust the pupil and lead him to hate all study.

5. Some of the chief difficulties which beset a teacher in the management of a country school are the following: 1. The great amount of labor to be performed arising from the school not being graded. 2. Insubordination from bad predecessors. 3. Interference of parents. 4. General prejudice against innovations.

I BELIEVE there is no profession in which there is so much danger of a shriveling up in intellect and powers as that of teaching. I assign as a cause the fact that teachers are too apt to imagine that they have learned all that there is to know.—*Senator Garfield.*

COLLEGE DEPARTMENT.

DEVOTED TO THE INTERESTS OF THE CENTRAL NORMAL,
DANVILLE, INDIANA.

CONDUCTED BY G. DALLAS LIND.

DEAR FRIENDS:—It is with sadness we commence our letter this month with the announcement of the death of M. T. Travers, a former member of the faculty and one beloved by all who knew him, either in the capacity of teacher, student, or citizen. At General Exercises when the news came a committee was appointed consisting of Miss A. Kate Huron, Laqmer West and Maurice Willis, who reported the following resolutions, which were unanimously adopted:

WHEREAS, We, the students and faculty of the Central Normal College of Danville, Ind., have heard with sadness of the death of our beloved fellow student and associate teacher, Mr. M. T. Travers, at his home at Mt. Erie, Ill., on Feb. 29, 1880; Therefore,

Resolved, That we realize, in his death, the loss of a dear friend, an earnest worker, and a true man; that we deeply mourn that one so young, so noble, so full of bright prospects and anticipations for the future should be cut off while crossing the threshold of life.

Resolved, That as a student of this Institution, he had endeared himself to all by his manly, christian character, his untiring industry, his kindly social nature, as well as by his recognized talents; that as a teacher he had, already won unusual success, and gave promise of eminence and wide usefulness.

Resolved, That we extend to the family and relatives of the deceased, our heartfelt sympathy in this their great bereavement, knowing, however, that only He who gave and has also taken away, can comfort and uphold them. Although we may no more feel the clasp of his hand, or hear the sound of his voice, or look upon his face,

"Yet Love will dream, and Faith will trust,
(Since He who knows our need is just),
That somehow, somewhere, meet we must."

Resolved, That a copy of these resolutions be sent to the county papers and THE NORMAL TEACHER for insertion and that a copy be forwarded to the family of the deceased.

The following brief note tells another sad story:

New Castle, Ind.

Your worthy patron student, Harvey Schildknecht, departed this life Feb. 8, 1880, and died happy. Yours Truly, E. J. SCHILDKNECHT.

We wish all who were here a year ago could take a look at General Exercises one of these mornings. You would see perhaps many faces which you saw then, and many, many, new faces. You would be surprised how the seats are filled up. It begins to look like a Methodist Quarterly meet-

ing or a political mass convention as far as numbers are concerned. We are literally swarming like a bee hive. The bee hive allusion is a good one for Normalites are workers, which fact you need not be told.

Harry Fritz, of Gosport, Ind., will be here the short term.

J. T. Morton, of Centreville, Ind., says he will be back this month, that he is tired of being away from the Normal.

Cora S. Carson writes from Valley Mills, Ind., as follows: "I have examined your last circulars and can find nothing contrary to what I have witnessed with my own eyes while I was in your school. My stay with you has been of great benefit to me and I shall in the future use my influence in leading others to that fountain of knowledge which has been formed by the hard labor of its energetic teachers."

Eva Marshall, Pecksburg, Ind., will be here the summer term.

Read the following from John Kendall, Principal of Amo, Ind., Schools, who was with us last year: "The new features certainly augur well for success. An Institution which seeks to develop the natural tastes and inclinations of the young in acquiring an education, as well as to give force to the natural laws in imparting instruction deserves to live and prosper. No pupil should allow himself to be deceived with the idea that old time hard study can be supplemented, neither should they be allowed to *stuff* to the exclusion of the practical and useful."

Tom W. Smith is teaching at Tolono, Ill.

J. E. Rynerson is teaching at Clinton, Ind., and says he will be back when his school is out.

C. L. Prugh writes a characteristic letter from Gratis, Ohio.

Bessie Long, writing from Reno, Ind., says, "I can not understand how a person can be a true Normalite and not read *THE NORMAL TEACHER*." You are right, Bessie, that is just what has puzzled us all the time.

J. Newton Selby writes to Prof. Adams, from Tunnelton, Ind., "I can not help but admire your untiring efforts to make your school the best in the country, and consider the additions recently made, great strength added to the already strong force."

Three of the six departments in the Plainfield, Ind., schools are taught by Central Normalites. L. T. Farabee, Miss Lizzie Tomlinson, and Miss Minnie Wilkin.

R. C. Drake is attending Law Lectures in Indianapolis.

J. B. Haverstick of Nora, Ind., is managing a farm and says though he never intends to teach that he is a subscriber to *THE NORMAL TEACHER* and would not do without it for twice its price. He expects to return to the Normal next year.

Lizzie Milhouse writes from Valley Mills, Ind., and says, "I shall never forget the *Normal* and especially our *Grammar* class."

J. B. Young, of Union, Pike Co., Ind., has gone home to teach a select school at \$50 per month. A letter from him since his arrival at home says he enjoyed the 150 mile trip in his buggy over the muddy roads, and met many Normalites on his way.

Frances E. Robinson is teaching at Bloomington, Ind., and expects to be back for the short term.

The following from a county paper speaks for itself: Adams, Ind., Dec. 6.—Wm. T. Markland delivered a lecture at this place last Saturday evening. Notwithstanding the storm, he addressed one of the largest audiences we have seen here for some time. He discussed "Mythology" in a manner that not only interested his hearers, but showed that he thoroughly understood his subject. Mr. Markland is a young man of rare intellectual abilities, and possesses a rich, melodious voice, which, of itself, was a source of general comment. The audience tendered the speaker a vote of thanks for his able lecture, which he accepted in his usual humorous but courteous way.

G. M. Webster is at Brazil, Ind., with a school of 72 pupils and will be back to the Normal when his school is out.

Here is a letter in the beautiful chirography of Rose D. Abernethy, of Allison, Ill. She says THE NORMAL TEACHER is "a real teacher propeller," and that it is "no trouble to keep up an interest in school if you adhere strictly to Normal teaching." Her school is of course a success.

Mr. Melville T. Smith and Miss Mollie Greathouse, two Normalites were made one on the 9th of March, 1880, at Reno, Ind. They have our best wishes.

The Aurora Literary Society has increased largely in numbers and interest during the past term. Several popular lecturers have been here under its auspices.

PUBLISHER'S DEPARTMENT.

OUR new Premium Circular is now ready.

THE Summer Term of the Central Normal College opens April 20, 1880.

THE Central Normal College never had brighter prospects than at present. It is enrolling students by the score every week. Next term will be very large.

SUPT. DOBSON in speaking of the Danville Normal, says: If *good* and *successful* work on the part of its students is a test of the merits of a school the *Central Normal* is the peer of any of them.

It is with sadness that we record the death of Prof. M. T. Travers. Prof. Travers was a most noble young man, a close student, an excellent teacher and a true friend. He was loved and admired by all who knew him. He was a Normalite in every sense of the word. He sent in the first club that was ever made for THE NORMAL TEACHER. Popular education and the Institution of which he was a member have sustained a great loss, in his death.

G. W. WAYLAND the Book and Paper man of Danville, calls attention to his stock of goods in another column. As all teachers have constant use for books and paper we hope that our readers will open a correspondence with Mr. Wayland at once.

THE Central Normal College, Danville, Ind., offers the best inducements to young ladies and gentlemen seeking Normal training of any school within our knowledge. We hope that none of our readers will go anywhere to school before they investigate the claims of this Institution.

READ our premium list on another page and make up a club at once. You will not find it hard work to make up a good club and the premium we will send you will more than compensate for your time and trouble. You will find it a pleasure to circulate so practical a school journal as THE NORMAL TEACHER.

WE hope that our Agents, County Superintendents and others interested in the circulation of school literature will keep it constantly before teachers that THE NORMAL TEACHER is by far the *cheapest* and *most practical* school periodical published. At the low price at which THE NORMAL TEACHER is furnished there is no reason why every teacher should not subscribe for it.

PROF. REUBELT's Demonstration in this number really requires an additional figure, but as the communication was received too late to send to our engraver we are obliged to insert it using only one diagram, the cut of which we had prepared for another proposition. Any of our readers who are able to follow the demonstration will readily see what lines are meant which are not designated in the diagram.

WE desire it understood that we are now making engagements with agents for work at the teachers' Institutes during the summer. Many personal friends who would have made the best agents wrote us about Institute time last year saying we will work for you, do not give the agency to any one else. These friends were most generally disappointed as we give out territory several weeks before hand in order to be sure of a representative. Therefore, if any of our old agents wish to work for us this year, let them say so NOW.

WE must *insist* that our patrons do *not* send us postage stamps in amounts over \$1.00. We receive many dollars weekly in stamps, and as we can not use so many they are a *loss* as we can not sell them, except at a discount. There is no use in sending us one, two, three or more dollars *in stamps*, as some have done. We are willing to accept one, two or three cent stamps for small sums *less* than \$1.00, but when you send \$1.00 or more, send notes, money orders, drafts, but *don't* send stamps if it be possible to do otherwise.

PERSONS sending us newspapers containing notices which they wish us to read or use, will oblige us by marking the same. We often search from beginning to the end of a paper and can not tell what it is that the person who sends it wishes for us to read. Both the loss of time and the inability to find the news that is intended for us, is very annoying. Mark all articles, please.

Now is a most excellent time to canvass for our books. They sell readily and we give agents a large per cent. so that an agent who can do anything at all in the line of bookselling can make excellent wages with our books. We give a cash commission on subscriptions to *THE NORMAL TEACHER* sufficient to pay all the travelling expenses of an agent. Send for terms and take an agency now.

We left out Questions for Discussion at Township Institutes in this number, owing to the fact that so many of our Institutes have closed for the season. We have devoted the space to Notes and Queries. We hope that our readers will not be disappointed at this change. Those who are will oblige us by saying so. At the proper time we shall be glad to continue the publication of these questions.

We desire to call the attention of our readers to the advertisement of the New Home Sewing Machine to be found in our columns. We have one of these machines in use and can say that in our opinion it is the simplest and lightest running machine made. We would not exchange our machine for any other make with which we are acquainted. All persons interested should investigate the merits of this machine.

Everybody who writes to any advertiser in *THE NORMAL TEACHER*, will do the advertiser and us both a *great favor* by saying that they saw the advertisement in *THE NORMAL TEACHER*. Advertisers will then *know* from what paper their applications come, and as *THE NORMAL TEACHER* is one of the best of mediums, advertisers will soon *know how it pays*. Always say, when you write to an advertiser, "I saw your advertisement in *THE NORMAL TEACHER*."

PROF. G. WALTER DALE, Principal of the Chicago School of Elocution and Oratory has associated with him as instructors in his school Prof. Ethan B. Allen and Miss Lillian DeGarmo. We are informed that they are both excellent Elocutionists and skillful teachers. Miss Garmo is said to be the finest lady reader before the public. The summer term of this school will open June 21st. We are gratified to know that the prospect for a good attendance is flattering.

OUR circulation is large and rapidly on the increase. We receive on an average a thousand names per month. Our subscription list is now away up in the thousands. If we do as well in the next two months as we

have done in the past two we will have the largest circulation of any school journal published on the American Continent. We hope our friends will continue to roll in the names. We have just issued ten thousand copies of a new 8-page premium circular and we desire to send every one of them out within the next two months to parties who will use them to good advantage. We offer larger and better premiums than any publishing house in the U. S. If you doubt our statement a postal card will prove it. *Send for a Premium Circular.*

ALMOST every day we receive requests from teachers to diagram sentences, solve problems, answer questions, &c., by mail. The writers are generally in a hurry to get the answers for use at some teachers' meeting or Institute. For a while we attempted to comply with the wishes of these parties, but finding that it would take the time of one person to attend to all these requests, we have abandoned the idea of attempting to answer any of them. Our time is too valuable to be devoted to answering questions, &c., for nothing. If an answer to a question is worth anything to a teacher, let him pay for it. Those who have not heard from their communications may accept this as an explanation. However, if any one has a question he desires answered, sentence diagrammed, or proposition demonstrated and can not wait to have it answered through the columns of THE NORMAL TEACHER let him send along 25 cts. or 50 cts. and we will do the best we can to accommodate him.

WE have started out with the determination of securing an agent in every county in the U. S. to represent our house at the Institutes the coming summer. We give such terms that every energetic agent can make more working for us than for any other journal. We hope that County Superintendents and influential educators will put some of their influential teachers in correspondence with us at once. To deserving persons recommended by County Supts. we will render every aid in our power. Let every one who thinks of working for us this summer write us at once. Remember that our works are pronounced to be the cheapest and most practical of the kind published, and that they will sell to every teacher. They are bound to sell because they are just such books as every teacher needs. We did a big business last summer at the Institutes but we will do an immense business this summer. Those who would consult their own interests will write us at once for our WONDERFUL CIRCULAR.

BOOK TABLE.

INSECT LIVES; or Born in Prison. By Julia P. Ballard. pp. 98, Quarto, Cloth, \$1.00. Cincinnati: Robert Clarke & Co.

This is a beautiful little book not only in the mechanical execution but in matter and style. There is no more interesting study than that of Entomology and we are sorry to say that there are but few elementary works on the subject. Ponderous volumes, costing from ten to fifty dollars have

been prepared treating of butterflies alone. Why can't we have more such works as the one before us telling the story of the commonest insects in a simple manner? The book tells how to capture, prepare and mount insects for preservation and how they may be obtained by rearing from the egg.

ARITHMETIC FOR YOUNG CHILDREN. By Horace Grant. American Edition. Edited By Wm. Small. Boston: Lee & Shepard. New York: Chas. T. Dillingham.

This little work is intended for the instruction of children between the ages of three or four, and six or seven. This would seem to be a rather tender age to begin instruction in the operations of arithmetic. While it is true that children develop the idea of number to a certain extent, at a very early age, we doubt the propriety of drilling them on such subjects until they are at least eight or nine years of age. We think they will make just as rapid improvement as if they had been taught earlier. Let their bodies grow and teach them to observe concrete objects rather than the abstractions of number. But if the principle of beginning the subject thus early is correct, then this book is just the thing for the teacher, as the subject is brought down to the utmost extreme of simplicity that is consistent with sense.

A SHORT GERMAN GRAMMAR FOR HIGH SCHOOLS AND COLLEGES; By E. S. Sheldon, Tutor in German in Harvard University. Boston: Ginn & Heath. 103 pp.

The author has made his book a short one by omitting the unimportant details. The German constructions which differ so little from the English are treated slightly as they are best learned by practice in reading and translating. The author thinks it is of more importance to be able to read German than to be able to speak it. The mechanical execution of the book is very good.

OUR COMMON SCHOOL SYSTEM. By Gail Hamilton. Boston: Estes & Lauriat. 358 pp., \$1.50.

And now we have something rich, rare, and racy, on what would seem to be a dry subject. Gail Hamilton always deals sledge hammer blows and nearly always hits in the right place. This book has already excited much comment as she slashes unmercifully certain features of our school system. First, we have a chapter on *Equalizing Wages*, to which no teacher will object. The next chapter is on *High Schools*. Here the writer takes a position at variance with, perhaps the majority of educators. She maintains that the State should not pay for a higher education than that given in the common or district school. That city and country should be treated alike by the State and where there are those who wish higher instruction than that of the common school, they should pay for it and if they paid for it themselves they would have more of purpose and enthusiasm, of independence. There is much of truth in this. After all, the world is the great educator. The young man who succeeds is generally the man who having had a common school education goes to work and earns the money to give him a term or two in some higher institution, where knowing that his time is money and life to him he works with enthusiasm and a purpose and be-

comes prepared to enter the higher college of the actual business world. The writer is opposed to *Industrial Schools* which forms the subject of the next article. The arguments are very much the same as those in the preceding article. Her next chapter is on *Normal Schools* and upon this point we have somewhat to say. It is very evident that Gail has never beheld the workings of a truly Normal School. If she refers to the institutions which generally go under that name we can agree with nearly all she says. There are a few truly Normal schools in the land where young men and women may educate themselves or be trained in the Normal or natural way freed from the childish restraints, from the ruts and crammings of our colleges and State Normals. Could Gail Hamilton have spent a few days in Danville before she wrote that chapter we venture it would have been quite differently written. Under the heads of *The Form of Blanks, Examination under the Microscope, The Supervisory Fever, Milk for Babies, Official Supervision and Personal Supervision, On the World-wide Sea, Purification by Supervision, The Foolishness of Teaching, Corporal Punishment, Salary of Teachers, The Degradation of the Teacher* and *For Substance of Doctrine*, she makes many startling points. No one can read the book without being made better even if he does not believe half it says.

INGERSOLL AND MOSES, A Reply. By Prof. Samuel Ives Curtis, D. D. Jansen, McClurg & Co., Chicago, \$1.25.

This new addition to the numerous replies which Col. Ingersoll has excited by his bold assertions, is more complete and thorough than any which we have yet seen. But really Col. Ingersoll and all his critics would be in much better business if they would let subjects which they do not know anything about, alone, and tell people how to live and act in society. Our beliefs are not half so bad as our acts.

KEY TO GHOSTISM. Science and Art Unlock its Mysteries. By Rev. Thomas Mitchell, author of "Philosophy of God and the World," etc. 12mo, pp. 249. Cloth, price, \$1.50. New York: S. R. Wells & Co., Publishers, 737 Broadway.

This book is a refutation of the philosophy and an exposure of the arts of Spiritualism. The author is a strong believer in Phrenology and imputes the existence of Spiritualism to a perverted action of the faculty of Marvelousness. While we would not agree with quite all that he says on some points we think he is correct in this and his exposition of the tricks and frauds by which this so called philosophy of Spiritualism is maintained is worthy of the perusal of every one. It is indeed strange that in this age of civilization so many people should be imposed upon by designing tricksters.

HOW TO EDUCATE THE FEELINGS OR AFFECTIONS. By Charles Bray. Edited, with Notes and Illustrations, from the Third London Edition, by Nelson Sizer, Author of "How to Teach," etc. 12mo. extra cloth. Illustrated. Price, \$1.50. New York: S. R. Wells & Co., Publishers, 737 Broadway.

This an excellent work and should be in the hands of every teacher and parent. There is no other way to get rid of jails and penitentiaries than by so

educating the passions and propensities as to make them subservient to moral and civil laws. The author views the subject from a Phrenological standpoint. We have seen nothing equal to it since Combe's Constitution of Man. The work is illustrated with portraits of noted characters, and is written in a clear and logical style.

BRAINARD'S MUSICAL WORLD.—The Musical World for March is received. The present number contains an elegant portrait of Miss Emma Thursby, drawn expressly for the Musical World, the usual amount of valuable musical news from all parts of the world, musical literature, Karl Merz's "Musical World Letters," and a variety of new music, consisting of two new songs, two piano pieces, and an arrangement of "Nancy Lee" for piano and violin. The Musical World is without doubt the most popular and successful musical paper in this country. Send fifteen cents to S. Brainard's Sons, Cleveland, Ohio, for specimen copy. Subscription price \$.50, or \$1.60 with valuable premium.

S. L. MORROW & Co., Indianapolis, are offering agents the most liberal terms on their New Illustrated Indiana History, Historical Bibles, Voter's Text-Book, and other standard works.

BOOKS.

ROBERT CLARKE & CO., Cincinnati, O., give special attention to Mail Orders for books and Stationery. Their Catalogues and Monthly Bulletin of New Books will be found very convenient in selecting books to purchase, especially to persons living at a distance from large book stores.

VALUABLE CATALOGUES.

The following are sent on receipt of a three-cent stamp each:

AGRICULTURE.—Horticulture, Floriculture, Stock, Fruit, etc.

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EDUCATION.—Science of Teaching, Kindergarten, etc.

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FINE ARTS.—Drawing, Painting, Sculpture, Ceramics, etc.

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THE NORMAL TEACHER.

VOL. III.

DANVILLE, IND., MAY, 1880.

No. 3.

HOW TO KEEP THE DEVIL OUT OF THE SCHOOL-ROOM.

G. DALLAS LIND.

We do not mean any personal devil. We do not mean any barb-tailed, oblique-eyed, long-eared Mephistopheles. (Those who have not read Goethe's Faust should look up the meaning of this term in Webster's Unabridged under the head of "Noted Names of Fiction, &c.") But this we mean. There is a spirit of insubordination, a spirit of mischief which creeps into every school-room unless the proper means are taken to keep it out. How to keep out this spirit is a question which doubtless has vexed and worried every teacher of an ungraded school and no doubt many who have only young men and ladies under their care in high schools and colleges have found it a sore problem to solve.

Let us see what are some of the ways to keep out this devil. But first we will ask what means should not be used. *Should force be used?* Not *direct* force. He who governs by arbitrary means, who must be despotic and resort to punishments or the fear of punishments to secure order, should have no place in the school-room. Punishments are, indeed, necessary and despotic power should sometimes be used but only where all other means fail. Had we the training of

children from infancy up and knew just how to train them, force would never be necessary. But the teacher has not always had his pupils under his care and he is not always so gifted as to be able to train them properly, so that force becomes sometimes a necessary evil. Force if used when other means would answer will tend to raise whole legions of devils and though you may be able to keep these little devils in subjection, it is high pressure work. It is too much, as we have said somewhere before, like sitting on the safety valve of a steam engine with the indicator showing a high degree of pressure.

Should prizes be given to bribe the devil to stay out? We think not. Though in some cases it may do, there is a much better and cheaper way. The principle of hiring a person to do right does not seem the proper one. The person who will do right only for a prize will not hesitate to demand better wages for his work. He is apt to overestimate his worth and will have to be bribed still more to hold him in his place. He is too apt to make "strikes."

1. *The teacher should teach well.* He should so understand the branches he is required to teach and have such a knowledge of the best methods of instruction that he may proceed with his duties smoothly and systematically showing that he is master of the situation. This topic includes much. In fact, it includes all the following topics and much more, but we have seen fit to make this division that we may make the subject clear in as few words as possible. Why do we say this includes all that is to follow? Because government should be as far as possible taught just as the sciences are taught, just as reading and spelling are taught, not exactly in the same way by regular recitations, but as a part of every recitation, and in every movement, in fact, in the school-room. Now, if the teacher teach well, he will govern well, because government is a part of the teacher's work. But we will be more specific.

2. *The teacher should set an example of order and system, by being orderly and systematic in all that he does.* No teach-

er can maintain good order in school who is not a living example of good order. The pupils will naturally copy after the teacher and more especially in this respect. If the teacher goes blundering around with heavy boots, if he has no order of recitations, no programme of business, if he talks too loud, or talks too much, he will have very little influence over the pupils, for these points will be copied and the teacher and pupils together will make a very disorderly school.

3. *The teacher should provide means to keep all profitably and pleasantly employed.* This is one of the great secrets of managing a school successfully. It is the angel of business that will keep the imp of mischief out. But this could have been treated under our first heading. It is a part of successful teaching to keep all employed. We would have you admit this fact and then apply your energies towards furnishing all with employment. We would say here that the highest tact is necessary to meet this requirement, especially in an ungraded school where you may find all ages and all degrees of advancement and almost every grade of character and disposition. Did you ever notice that the most mischievously inclined pupils were apt to be the brightest? The boy who has energy enough for mischief has energy enough for higher intellectual work, for mischief is an action of the intellect. What the teacher needs to do is to turn the activity in the right channel. A mischievous boy is simply a locomotive off of the track. Employment which is pleasant and profitable will keep him straight and will afford exit for his superfluous energies. But there are some pupils so full of life and enthusiasm that it seems almost impossible to find employment enough for them. They need sometimes physical exercise in addition to mental work to maintain their equilibrium. You may find out who these pupils are by watching closely their actions. They never sit still long at a time. Such restless dispositions should be made a special study. Many times if such a pupil is requested to bring a bucket of water or an armful of wood he will be diverted from the mischief he would otherwise get into and the safety

valve of his energies be opened. It will thus be seen that there are two ways in which employment becomes a remedy for mischief, first, by occupying the time and diverting the mind and second by acting as a vent for surplus nervous force.

4. *The teacher should be calm, watchful and firm.* If he is nervous and excitable and shows constantly that he is vexed and worried it will have a most pernicious effect on the pupils. They will see how easy it is to annoy him and if any are inclined to have a disliking for school they will take delight in doing little things to annoy the teacher. You have noticed how a person who is easily "plagued," as they say, is always made the subject to be operated upon in this respect. A teacher who is easily annoyed will be put to greater trials than one who takes everything calmly and patiently. He should try to cultivate this faculty of mastering himself. Patience is much needed by the teacher.

While he should not make a show of watching his pupils, he should be Argus-eyed and observe everything that is going on, that he may be able to check the very first tendencies to disorder. There is much in taking the proper steps in the beginning. Many a pupil is led on to commit some grievous misdemeanor by the indifference of the teacher to his first, little misdemeanor. Nip evils in the bud. Destroy the first germs. It is much easier to straighten the sapling than the full grown oak.

Firmness but not stubbornness should characterize the teacher. This fact is self-evident.

5. *The teacher should secure the aid of parents and school boards and act in harmony with them.* If a punishment becomes necessary we think it best to consult the parents first. If they manifest an indifference or concur with him and the case is not an aggravated one, then the teacher may proceed as his own judgement will dictate, but if the parents can not be made to concur with him and the case is a grave one, the school board should be consulted before further action is taken. In many cases it will be well to consult both parents

and directors in regard to managing pupils who have given former teachers trouble. Of course the pupil should not know that he is made the subject of the consultation. It is hoped that these few points will be suggestive to the beginner in the school work. Remember that there is a constant struggle for existence, a constant battle between truth and error, between right and wrong. We should constantly strive to keep back this devil. In this struggle the fittest will survive.

NORMAL SCHOOLS *vs.* COLLEGES.

BY A NORMALITE.

Having recently read an article upon Normal Schools which came to my notice in a college paper, I wish to discuss, briefly, some of the phenomena of these schools which most tax college credulity or excite college animosity. Gleaned, in order, from the article referred to, they are as follows: First, these schools assume to do as good and better work than colleges in half the time, which must be impossible, taking thoroughness and mental discipline into account. Second, they tack on to their curriculums preparatory medical and law departments, surveying, fine art and the like, which are altogether out of their 'sphere' and to which they are wholly incompetent to do justice. Third, their work consists of scattering generalization instead of the patient research which brings knowledge and discipline. Fourth, they ignore the fact that government is a "divine institution," and attempt to shift the burden of administration upon the pupils. And lastly and all-embracingly, they are supplanting colleges in many places, and by their cheapness in every respect, are tending rapidly to lower the standard of popular education.

These things above enumerated, constitute, it would seem, the substance of grief with our college friends, and the ground upon which our writer rests his objections to the

term '*just the thing*,' as applied to Normal Schools. Well, let us see for a moment if colleges are nearer being '*just the thing*.'

This world is still in a condition which requires work to be able to live upon it; most of us must, somehow, earn a living, and whether it is best to spend five or six years on a college course, storing away and committing to memory the mass of its curriculum with no connection between it and the work we ought soon to engage in, is the question. There may be those who have the money and leisure to make study and research their life work who can afford to do it, but the masses cannot. Yet all should be educated. The Normal school neither forbids nor discourages the minutest research but it *first* secures to the student a *general* comprehension of subjects such that if time and opportunity forbid deep research he may not be an ignorant man, but if turned out into the world may have such a grasp of things as will enable him to perceive the relation of things about him. And the *manner* in which this grasp of principles (which our friend calls "scattering generalization,") is secured proves to be worth more in seizing upon the *gist* of matters outside of school, by all odds, than the much talked-of *discipline*, of the storing away process. It has become a commonly accepted fact among business men and in the practical world at large, that college students turned loose, are characterized by nothing so much as their great 'unreadiness' being still 'mere boys in the art of living.' Thurlow Weed bluntly says; "The colleges turn out a lazy, shiftless set which it terms graduates." This opinion has permeated all classes of society, and in the face of the facts, which are patent to the most obtuse social philosopher, it is coming to be the public verdict that colleges as at present conducted are *not* '*just the thing*' for *any* body, much less for the *masses* of Americans. *This* is why "Normal schools are supplanting colleges in many places." The former love not higher education less, but *broader* education more. By *broader* we mean that which embraces the bone and sinew for living—a development of

powers rather than a going to seed, or spindling top-heavy into higher education. It aims at a training which will harmonize the forces of our being and fit us to take hold of the plain, homely work of life with philosophy and pleasure, and thus get the most out of existence. Such is the ideal of the Normal School, and the results of these schools must tell how nearly they realize the ideal. That their methods do lead to a more practical understanding of any given branch in far less time than the methods of other schools can neither be gainsaid nor denied.

No feature of the Normal Schools is, we think, more worthy of imitation than that of throwing young people upon their own responsibility as citizens, amenable only to civil authority and the laws of good society. As a writer in the *American School Journal* puts it, "Young men who are treated as ordinary members of society, are not confirmed in the preposterous self conceit and in the obnoxious disregard of proprieties which distinguish college students." We know of no government which has more of the divine approbation than *self* government. It is plain on the face of it that those who require to be kept in order by close surveillance and the minute supervision of college professors, as soon as the restraint is removed will, unaccustomed to *self* control, fall into calamity.

While we do not know that the preparatory departments of Law, Medicine, Telegraphy, and the like add anything to the efficiency or usefulness of normal schools, never having tested them, we know of no law limiting the 'sphere' of normal schools. State normals, managed chiefly by college men and maintained by school funds, may be bound to keep within the limits of subjects bearing immediately upon the teaching profession, but independent schools are not thus restricted, and if normal methods are worth anything at all, they should be successfully applied to the learning of any subject. We know of no school which attempts more than a very elementary work in these departments as yet, but they do nothing more than to give students an idea of *how* to

study these subjects when they enter upon them fully, it is time and money saved to them. So far from hearing complaints from normal students of being *victimized* in any way, it is as our college writer contemptuously says: "Their graduates, scattered all over the land in our public schools, proclaim with the zeal of patriots the superior advantages of these schools."

BEAUTIES OF HIGHER ALGEBRAIC EQUATIONS.—NO. II.

ELIAS SCHNEIDER.

In this article I propose to examine the following simultaneous equations:

$$\begin{aligned} x^2 + y &= 7 & (1) \\ x + y^2 &= 11 & (2) \end{aligned}$$

It is very readily seen that two of the roots of these equations are 3 and 2. But, it would be no solution to substitute these roots in the equations and merely verify them. These equations have 8 roots; that is 4 values of y , and 4 of x , and the equations are each an equation of the parabola. The shortest known solution for finding two of the roots is the following:

$$x^2 + y = 7 \quad (1)$$

$$x^2 + y - 3 = 4 \text{ by subtracting 3 from each member.}$$

$$y - 3 = 4 - x^2 \text{ by transposing.}$$

$$\frac{y-3}{2+x} = 2-x \quad (3) \text{ by dividing each member by } 2+x.$$

$$x + y^2 = 11 \quad (2)$$

$$x + y^2 - 9 = 2 \text{ by subtracting 9 from each member.}$$

$$y^2 - 9 = 2 - x \quad (4) \text{ by transposing.}$$

$$y^2 - 9 = \frac{y-3}{2+x} \text{ by equating (3) and (4)}$$

$$y^2 - 9 = \frac{y}{2+x} - \frac{3}{2+x} \text{ by separating second member into 2 p'ts.}$$

$$y^2 - \frac{y}{2+x} = 9 - \frac{3}{2+x} \text{ by transposing.}$$

$y^2 - \frac{y}{2+x} + \frac{1}{4(2+x)^2} = 9 - \frac{3}{2+x} + \frac{1}{4(2+x)^2}$ by completing the square.

$y - \frac{1}{2(2+x)} = 3 - \frac{1}{2(2+x)}$ by extracting the square root of each member.

Hence, $y=3$, for the two fractions $\frac{1}{2(2+x)}$ cancel each other, and $x=2$

From $x^2+y=7$.

we have $y=7-x^2$

and $y^2=49-14x^2+x^4$, by squaring each member.

Now substitute this value of y^2 into the equation $x+y^2=11$, and we get $x+49-14x^2+x^4=11$ or $x^4-14x^2+x+38=0$.

Dividing this last equation by $x-2$ we get $x^3+2x^2-10x-19=0$. This equation has 3 roots. By Horner's method we find these values of x to be

$$\begin{aligned} &3.131312518+ \\ &-1.848126527+ \\ &-3.283185991+ \end{aligned} \quad \text{The sum of these roots is } -2.$$

Again, from $x+y^2=11$ we have $x=11-y^2$

and $x^2=121-22y^2+y^4$, by squaring each member.

$121-22y^2+y^4+y=7$ by substituting the value of x^2 into $x^2+y=7$

$y^4-22y^2+y+114=0$ by transposing

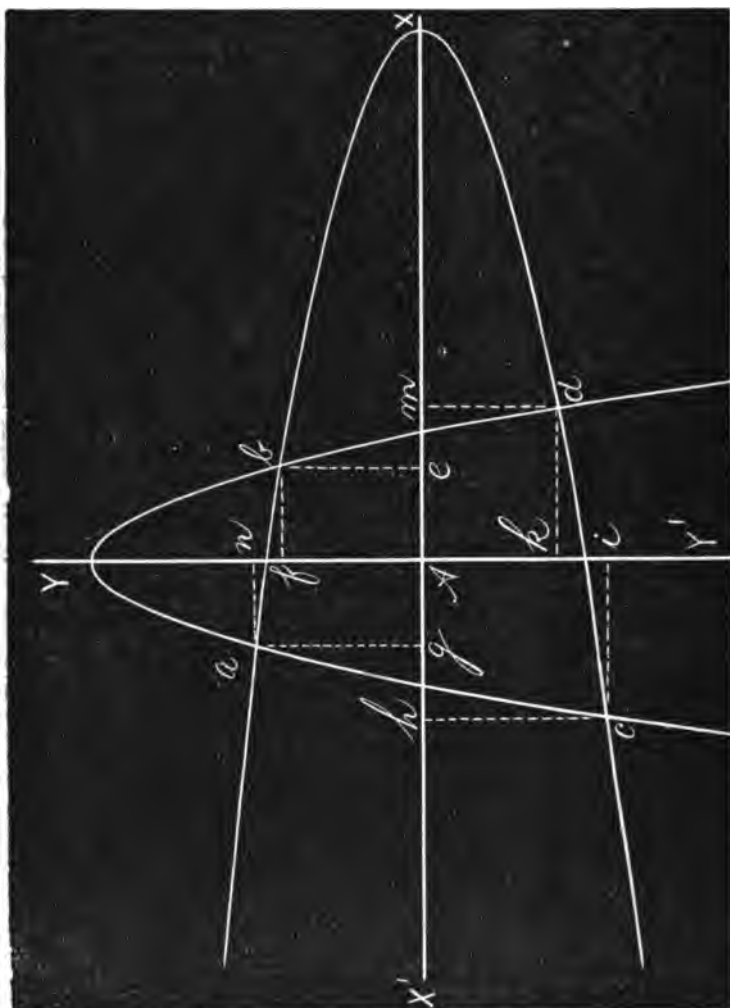
$y^3+3y^2-13y-18=0$ by dividing the last by $y-3$

By Horner's method we find the 3 values of y of this equation to be

$$\begin{aligned} &3.5844283403+ \\ &-2.8051180869+ \\ &-3.7793102534+ \end{aligned} \quad \text{The sum of these roots is } -3.$$

The first two equations have therefore 8 roots. Let us now trace the curves and see how these roots show where the curves intersect each other. The points of intersection of these two curves of the parabola are at a, b, c, d . The distances to the right of $Y A Y'$ are positive, and those to

the left of that line are negative. The distances above the line $X A X'$ are positive, and those below it are negative. The roots represented by x are $f b=2 k d=3.131312518+$ $n a=-1.848126527$ and $i c=-3.283185991+$. The roots represented by y are $e b=3, g a=3.5844283403+$ $m d=-2.8051180869+$ and $h c=-3.7793102534$.



The sum of the 3 roots of $x^3 + 2x^2 - 10x - 19 = 0$ is equal to -2 , the co-efficient of the second term with its sign changed; the sum of the products of the roots taken in sets of two is equal to -10 , the coefficient of the third term. That is $(3.13131251)(-1.84812652) + (3.131312518)(-3.283185991) + (-1.848126527)(-3.283185991) = -10$; and the product of all the roots with their signs changed is equal to the last term. That is $(3.131312518)(-1.848126527)(-3.283185991) = +19$.

The same result, in regard to the roots of the equation $y^3 + 3y^2 - 13y - 18 = 0$, may be obtained in a similar manner.

Therefore the work is correct.

IN our country and in our times, no man is worthy the honored name of a statesman who does not include the highest practicable education of the people in all his plans of administration.—*Horace Mann*.

THERE have been a good many things in America more foolish than the old-fashioned custom of "boarding 'round" by the school teacher. What a different set of creatures is this crowd of half a hundred youngsters to you, after you have visited them in their homes and seen the frame in which each one is hung up in that domestic gallery! That fretful little Johnny, that worries you like a bouquet of nettles—what another boy he seems after you have looked into his mother's face and heard the wonderful story of how she nursed him through the scarlet fever that tossed him back into her arms from the gates of death, weakened for life in body, if not crippled in mind. Do you not go home from that visit with a heart full of tears and a prayer that God will help you and his mother to work together for poor Johnny? There is no real school teaching till the school-master and mistress, the father and mother, "keep school" together.—*Rev. A. D. Mayo*.

CORRESPONDENCE.

PARTIAL PAYMENTS.

Editor Normal Teacher:—I think an improvement may be made on the books with reference to this rule. I will form an example:

\$4000.

Danville, Jan. 25th, 1861.

For value received I promise to pay on demand, to T. H. Rose, or order, Four Thousand DOLLARS, at the rate of six per cent. interest per year.

PETER PIPER.

On the above note I find the following indorsements:

March 25th, 1862, \$2000.

Dec. 23d, 1863, ... \$ 200.

June 3d, 1864, ... \$1551.44.

June 3d, 1866, ... \$ 100.36.

Oct. 3d, 1867, ... \$ 803.16.

What was due April 17th, 1870?

I will first make a time table. In the first column I place the year, month and day, beginning with the date of note, then the dates of the payments in order, and finally the date of settlement.

I subtract from above downward, and in the second column place the results. In the third column I place these results reduced to the lowest denomination mentioned. In the fourth column I place the payments in order. In the last column I place first the face of note, followed by the several principals as I find them by cancellation across the vertical line.

1861— 1—25	—	—	—	\$4000
62— 3—25	1—3—0	14 mos.	\$2000	\$2280
63—12—23	1—8—28	628 da. }	\$ 200	
64— 6— 3	0—5—10	160 da. }	\$1551.44 }	\$ 828
66— 6— 3	2—0—0	2 yrs.	\$ 100.36	\$ 827
67—10— 3	1—4—0	16 mos.	\$ 803.16	\$ 90
70— 4—17	2—6—14	914 da.		\$ 103.71

The advantages of the above table are readily seen. We get the work before us in a concise form. At starting we have nothing in the last column but the face of the note. As we proceed we place the successive principals as we obtain them, erasing the work of cancellation necessary to produce them, so that at the close we have nothing before us but the "time table" complete, the last principal in the last column being the required answer.

Notes are written on the board and the pupils copy and take them home at night. In the morning they return the time table complete as above on a small bit of paper. The teacher who has worked the example, compares the last line with his own in a minute, and nothing more is needed.

I will now work the above example, retaining all the work to enable the pupil to follow it with his slate or board work.

In my work I will omit the cancellation as the learner is supposed to understand that.

$$\begin{array}{r|l}
 12 & 4000 \\
 100 & 14 \\
 & 6 \\
 \hline
 & 280 \text{ Int.} \\
 & 4000 \\
 \hline
 & 4280 \text{ Amt.} \\
 & 2000 \\
 \hline
 & 2280 \text{ Prin..}
 \end{array}$$

Now, by trial I find the next interest to be more than the payment. So I couple 628 and 160 days—and also couple the payments \$200 and \$1551.44 and proceed as before.

$$\begin{array}{r|l}
 360 & 2280 \\
 100 & 788 \\
 & 6 \\
 \hline
 & 299.44 \text{ Int.} \\
 & 2280 \\
 \hline
 & 2579.44 \text{ Amt.} \\
 & 1751.44 \\
 \hline
 & 828 \text{ Prin.}
 \end{array}$$

$$\begin{array}{r|l}
 & 828 \\
 100 & 2 \\
 & 6 \\
 \hline
 & 99.36 \text{ Int.} \\
 & 828 \\
 \hline
 & 927.36 \text{ Amt.} \\
 & 100.36 \\
 \hline
 & 827 \text{ Prin.}
 \end{array}$$

$$\begin{array}{r|l}
 12 & 827 \\
 100 & 16 \\
 & 6 \\
 \hline
 & 66.16 \text{ Int.} \\
 & 827 \\
 \hline
 & 893.16 \text{ Amt.} \\
 & 803.16 \\
 \hline
 & 90 \text{ Prin.}
 \end{array}$$

$$\begin{array}{r|l} 360 & 90 \\ 100 & 914 \\ \hline & 6 \end{array}$$

13.71 Int.

90

\$103.71 Ans.

Let any one work a few "note" examples by this method, and I think he will never use any other. Quite young pupils learn it perfectly in a few recitations and are delighted. They never understood it before. Business men will find it very simple and superior to their old methods. Of course one should understand the method of working interest by cancellation developed in a former article.

T. H. ROSE, M. D.

A TEACHER'S THOUGHTS.

Editor Normal Teacher:—Teachers should always keep in mind that they have the future of a free people in their hands, and that they have a work to perform which should give them both pleasure and profit and should exercise the utmost care to set a proper example for our future statesman, executive and judicial officers of a free government.

First impressions are the most lasting; and as the teacher is the first model, that model should be as nearly perfect as it is possible for mortal men and women to be.

If we could have model men in every school-room, our pupils would be safe, and a change of teachers could be effected without damaging the schools and pupils would always have examples before them that any person might emulate to his everlasting joy and honor.

Teachers should be magnanimous. It is often a help to a teacher to be imposed upon by some *unknown* party, if he is generous enough to bear it patiently: he thus gets sympathy from his pupils which could be enlisted in no other way. This brings the pupils and teacher on more equal terms and awakens in them a desire to do right and to be more considerate in their conduct toward him.

Ours is a glorious work. We lay the corner stones to churches, universities, charitable institutions, reforms, and the basis of good society and good government. Thomas Hughes in his *Tom Brown at Oxford*, says, "The very truth is, that all wise princes respect the welfare of their estates, and consider that schools and universities are (as in the body), the noble and vital parts, which, being vigorous and sound send good blood and active spirits in the veins and arteries, which causes health and strength; or if feeble and ill-affected, corrupt all the vital parts, whereupon grow disease and death itself."

"A low standard for a few years in our schools and colleges might (and no doubt would), corrupt the whole country."

Then let us be *upright, noble, honest*, and TRUE TEACHERS.

W T. DAVIS.

"IF IT RAIN, I SHALL NOT GO." "IF IT RAINS, I SHALL NOT GO." WHICH IS CORRECT?

BY T. A. PUGH.

To answer this question intelligently, we must examine established usage. Both of the above forms are in our late grammars. The question was asked in Vol. II, No. 2, of THE NORMAL TEACHER.

Let us examine some of our noted writers on this subject.

I. LOCKE.

1. "If these propositions *are* by nature imprinted."
2. "If the soul *doth* think in sleep." "If he *does* not reflect."
3. "If your lordship *means*." "Whether the substance *thinks*."
4. "If principles *are* innate."

II. ADDISON.

1. "If the reader *has* a mind to see a father of the same stamp."
2. "If exercise *throws* off all superfluities."
3. "If it *dissipates* a growing distemper."

III. PITT.

1. "If a negro *works* for himself."
2. "If their conduct *displays* no true wisdom."
3. "If this measure *comes* recommended."

IV. POPE, COWPER, AND MILNER.

These writers use both the indicative and the subjunctive form of the verb.

Thus Pope says: "If he *gives*," and "If he *be* absent."

Cowper says: "If vengeance *strike*," and "If it *does* not."

Milner says: "If he is a pagan," and "If man *be* subject."

The above sentences are taken from Webster's Dictionary. Webster, himself, gives us these directions in regard to "If it rains, and "If it rain:"

1. "Use the indicative form of the verb after *if*, when it expresses a conditional event in the present time, and past tense conditional."

2. "When we wish to speak of a future contingent event always use the auxiliaries that are proper for the purpose."

Dr. Webster remarks further: (farther?)

"I would never use the subjunctive form, *if it rain*, in prose; and in poetry, only from necessity, as an abridged phrase, for if it *shall* or *should* rain. In this manner the distinction between the tenses, which are now constantly confounded, may be preserved and made obvious, both to natives and foreigners." Now, according to Harvey, "If it rain," is subjunctive, and "If it rains," is indicative. Here we have Harvey against Webster. Some grammarians discard the potential mode, and others the subjunctive. The English language is truly a living language. It is subject to change. It is a good language. Let those of us who teach it, use good language. If we read the best writers we are more certain to use good language. Then with

Webster on our side, the expression "If it rain," is ruled out of our vocabularies, and "If it rains," is correct; which answers the question at the head of this article.

SHORTER ANALYSIS.

Editor Normal Teacher:—As THE NORMAL TEACHER is a medium for communications and comparisons of methods, I take the liberty of still offering a different plan for solving the example:

"If 12 oz. of wool make $2\frac{1}{2}$ yds. of cloth $1\frac{1}{2}$ yds. wide, how many lbs. of wool will it take to make 150 yds. of cloth $\frac{3}{4}$ yd. wide?" Noticed in Vol. II, Sept. No., p. 213, Dec. No., p. 331, and Vol. III, Jan. No., p. 9.

I shall solve the example by what is technically known as "Shorter Analysis" found in Prof. Holbrook's School Management. Arranging in steps and placing the numbers above or below the horizontal line according to the reasoning we have;

1. (Reading example constitutes 1st step).
2. 12 oz. is the base term, because it is the kind required in the answer.
3. If $2\frac{1}{2}$ yds. long requires 12 oz., 1 yd. will require less; hence, divide by $2\frac{1}{2}$.
4. If $1\frac{1}{2}$ yds. wide requires 12 oz., 1 yd. will require less; hence, divide by $1\frac{1}{2}$.
5. The result of this fraction, $\frac{12 \text{ oz.}}{2\frac{1}{2} \times 1\frac{1}{2}}$, gives the number of oz. required to make a piece of cloth 2 yd. long, and 1 yd. wide.

$$\frac{12 \text{ oz.} \times 150 \times \frac{3}{4}}{2\frac{1}{2} \times 1\frac{1}{2}} = 300 \text{ oz. } 300 + 16 = 18\frac{3}{4} \text{ lbs.,}$$
6. If 1 yd. long require the number of yds. expressed by this fraction, 150 yds. will require more; hence multiply by 150.
7. If 1 yd. wide require the number of oz. expressed by this fraction, $\frac{3}{4}$ yd. wide will require less; hence, multiply by $\frac{3}{4}$, (multiplying by a fraction gives less).
8. Cancel, and we have 300 oz. equal to $18\frac{3}{4}$ lbs., answer.

The horizontal line is far better than the vertical one because with the vertical line the pupil is at a loss to know which side of the line represents the divisor or dividend. The use of the horizontal line is more in conformity with the operations of Common Fractions where it is understood from the first that the numerator stands in the relation of dividend and the denominator the divisor.

The superiority of "Shorter Analysis" over the method by Compound Proportion is certainly unquestionable. The reasoning is so logical, from many to one, and from one to many. Another beauty is that the pupil's mind is burdened only with *two* terms at a time; each term being compared separately with the base term. Not so with Compound Proportion, hence the liability to confuse. Compound Proportion is seldom if *ever* well understood by pupils, while the system of Analysis will be comprehended in one or two lessons by pupils eleven or twelve years of age so that they will be anxious to analyze all the examples besides the mental

discipline derived from the reasoning is far superior. In fact, there is scarcely any reasoning by solving examples by Compound Proportion. Read the rule telling *how* to make the statement after which you multiply and divide, and obtain the answer. All reasoning is ignored and the whole arrangement is nothing but a mechanical process for the answer.

Now as to *cause* and *effect* our California teacher's "*sine qua non*" for "all examples in Interest, Partial Payments, Proportion, &c." Dr. Brooks in his *Philosophy of Arithmetic* p. 315, preaches its funeral. Hear him speak:

"This method was first introduced into arithmetic by Prof. H. N. Robinson, and has been adopted by several authors. The same idea was presented by an arithmetician of Verona, who distinguished the quantities into *agents* and *patients*. It is supposed that it tends to simplify the subject, enabling learners more readily to state a proportion than by a simple comparison of the elements. This supposition, however, is not founded in truth. Instead of simplifying the subject, the method of cause and effect really increases the difficulty and tends to confuse the mind. It lugs into arithmetic an idea foreign to the subject, to explain relations which are much more evident than the relation of cause and effect.

"Another objection to the method is that the relation of quantities as cause and effect is often rather fancied than real. In many cases, indeed, there is no such relation existing at all. Take the problem: 'If a man walk 6 miles in 2 hours, how far will he walk in 5 hours?' Will the pupil readily see which is the cause and which the effect? Will the advocate of the method, tell us whether the 6 miles or 2 hours are to be regarded as the cause? Or take the problem, 'If 18d sterling equal 36 cts., U. S., what are 54d sterling worth?' Would not the pupils be puzzled to tell which is the cause and which the effect? Indeed, there is no relation of cause and effect in a large number of such problems; and any effort to establish such a relation will confuse that which is simple and easily understood.

"If anything further is needed to show the incorrectness of the method, take a problem in what is called Inverse Proportion. Thus, 'If 3 men do a piece of work in 8 days, in what time will 6 men do it?' Here 3 men and 8 days would be regarded as the first cause and effect, and 6 men and the corresponding number of days as the second cause and effect. Now, if we form a proportion, we have the *first cause* is to *second cause* as the *second effect* is to the *first effect*; from which we see that in this case *like causes are not to each other as like effects*, a conclusion which completely contradicts the fundamental principle of the relation of cause and effect."

West Cairo, O.

J. E. BAKER.

THUS talks an old farmer about his boys: "From sixteen to twenty they knew more than I did; at twenty-five they knew as much; at thirty they were willing to hear what I had to say; at thirty-five they asked my advice; and I think when they go to forty they will acknowledge that the old man does know something.

EDITORIAL NOTES.

IN last number of *THE NORMAL TEACHER* we said that the instruction in our schools sixty years ago was imitative and mechanical. But the superficial training in the several branches of study can hardly be said to be the worst feature of those schools although it is surely bad enough of itself. Aside from the instruction, stern severity and cruel punishments were the order of the day. Long before the child was old enough to go to school, even in fact from his very infancy, he was governed at home by threats of the school and the school-master. As a natural consequence when the child did start to school it was with fear and trembling and oftener than otherwise he found the master a greater monster than his childish imagination had pictured. The rod, the cane, the raw hide, the ferule were necessary apparatus in every school—in fact all the apparatus to be found in many schools, and certainly all that the teacher knew how to use. The punishments of the teacher often exceeded the punishments inflicted in the prisons. Standing for hours on one foot, holding a heavy book at arm length in one hand, wearing a dunce cap and other similar devices, were the penalties to which the rude men of that time resorted. The learning and the government corresponded. One was wholly a mechanical process, the other consisted only of bodily punishment. What wonder that such schools did not make monsters and devils of those who came forth from them? No wonder that men and women should look back to such schools as dungeons and to the teacher as a taskmaster and jailor. But thank God this state of affairs has almost entirely changed. Instead of the teacher turning prison keeper and spending his study hours in devising means for torturing his pupils, he must be an educated man, and his hours of study are spent in devising new methods of interesting his school, and of preparing himself more thoroughly for his responsible position. Formerly teaching was practiced along with some handicraft; now undivided time and energy must be devoted to it. Teachers are themselves deeply impressed with the importance of their work, and of steadily and continually improving themselves. Children are no longer frightened with threats of the school-master. And when they enter the school they are kept quiet far otherwise than by blows. Each sits in his own seat busy with his lesson. The intercourse between teacher and pupils is characterized in a far different manner than by blows. They greet each other with friendly words. The work of the day is begun with pleasure by all. The teacher seeks to train his pupils to obedience, good order, good conduct and deportment and to all other good qualities. The well disposed pupil is managed by love. It is true that the teacher is often compelled to punish, but he punishes as a man acquainted with human nature and as a friend, first admonishing the pupil with kind words. Fear is not the sceptre with which he governs. It is only when admonition, stimulation and example have failed, and when duty absolutely demands it that he resorts to harsher means. It is his endea-

vor to treat his pupils as a conscientious father would his children. Their success is his pride and happiness; in it he finds the blessing of his difficult calling. How different the teacher from the school-keeper and taskmaster. Who will deny that a very great change has taken place in the men who not many years ago ruled our schools by brute force and the men and women who now *train* the children of our land?

JOHN HENRY PESTALOZZI, the greatest educational reformer the world has ever known, was born at Zurich, Jan. 12th, 1746. His father died when Pestalozzi was only six years of age. In reference to his early life he says: "I was brought up by the hand of the best of mothers like a spoilt darling, such that you will not easily find a greater. From one year to another I never left the domestic hearth: in short, all the essential means and inducements to the development of manly vigor, manly experience, manly ways of thinking, and manly exercise, were just as much wanting to me, as, from the peculiarity of my temperament, I especially needed them." We know that Pestalozzi is regarded by many as a mere theorist, a dreamer, an unsuccessful teacher. While in the management of some of his Institutions, this would seem to be the case, yet the most of his failures were the result of causes beyond his control. It must be remembered that his failures were not the result of the principles which he was striving to carry out, but that he labored all his life long to establish a self supporting institution. He had opposition from all quarters. Once or twice his school was broken up by invading armies; in other places his new modes of instruction did not please the people. But it can not be denied that he at length overcame all opposition in the founding of his last school known as the Pestalozzian Institute, the fame of which spread all over Europe, and even beyond the ocean, in America. Neither before nor since has any similar institution ever attained so great a fame. The work done in that institution became the foundation of the common schools of Germany; and as the historian puts it, "changed the ancient mechanical schools into institutions for real human training." The fundamental maxims or principles upon which the instruction there proceeded were as follows:

1. The basis of education is not to be constructed, but to be sought; it exists in the nature of man.
2. The nature of man contains an inborn and active instinct of development; is an organized nature; and man is an organized being.
3. True education will find that its chief hindrances are passive obstructions in the way of development; its work is more negative than positive.
4. Its positive work consists in stimulation; the science of education is a theory of stimulation, or the right application of the best motives.
5. The development of man commences with natural perceptions through the senses; its highest attainment is, intellectually, the exercise of reason practically, independence.
6. The means of independence and self maintenance is, spontaneous activity.

7. Practical capacity depends much more upon the possession of intellectual and corporeal power, than upon the amount of knowledge. The chief aim of all education, (instruction included), is therefore the development of these powers.

8. The religious character depends much less upon learning the Scriptures and the catechism, than upon the intercourse of the child with a God fearing mother and an energetic father. Religious education, like all other must begin with the birth of the child; and it is principally in the hands of the mother.

9. The chief departments for the development of power, are form, number, and speech. The idea of elementary training is, the notion of laying, within the nature of the child, by means of domestic education, (the influence of father, mother, sisters and brothers), the foundations of faith, love, of the powers of seeing, speaking and reflecting, and by the use of all the means of education, according to the laws and methods of development included within nature itself.

IN commenting upon these principles of Pestalozzi, Prof. Henry Barnard says: "The consequences of these principles are these:

1. The family circle is the best place for education; the mother's book the best book.

2. All instruction must be based upon training the intuitive faculty. The first instruction is altogether instruction in seeing; the first instruction on any subject must be the same in order to fruitful, active, and real comprehension of it. The opposite of this is the empty and vain mode of mere verbal instruction. First the thing itself should be taught, and afterward, as far as possible, the form, the representation, the name.

3. The first portion of instruction consists in naming things and causing the names to be repeated, in describing them and causing them to be described. After this, it should be the teacher's prime object to develop spontaneous activity, and for that purpose to use the fore-mentioned progressive and inventive method of teaching.

4. Nothing should be learnt by rote without being understood; the practice of learning by rote should be confined to mere matters of form. In the method of oral communication with the scholars is to be found an adequate measure for estimating the clearness and activity of the scholar's power of seeing, and his knowledge.

5. The chief inducements to the right and the good are not fear and punishment, but kindness and love.

This system has changed the whole condition of schools. It has not, it is true, yet penetrated all the schools, or all the teachers; but this is not the fault of the founder. To change a system established for centuries, is the work of centuries; not of a year, nor ten years. In the development of a nation, and in like manner of a school system, there are epochs, stationery periods, crises, and reactions."

GRAMMAR DEPARTMENT.

BY F. P. ADAMS.

1. He went up
- like*
- a balloon.

J. L. T., *Cora, O.*

"Like" may be disposed of in two ways: 1. As an adverb of manner, modifying *went*. 2. As a preposition, showing the relation of *balloon* to *went*. The second view is preferred.

The disposition given *balloon* will depend on that given to *like*. If *like* is a preposition, of course *balloon* is its object. But if *like* be parsed as an adverb, some preposition must be supplied, as *to* or *unto*. It is vicious to supply a verb as some do. Thus, He went up like a balloon [goes.] Usage sanctions no such use of *like*.

2. The staff of his spear was
- like*
- a weaver's beam.

Id.

Like in this sentence may be a predicate adjective or a preposition.

3. There is a limit at which forbearance ceases
- to be*
- a virtue.

Id.

To be has the construction of an adverb, limits *ceases*. *Virtue* is nom. case, in the predicate with the infinitive *to be* referring to the same thing as its subject *forbearance*.

Jacob loved *all* his sons, but he loved Joseph *the best*. J. J. KEITZ, *Pa.*

All is an adj., defin., lim. *sons*.

The is an adverb, limits *best*.

I laughed *myself hoarse*.

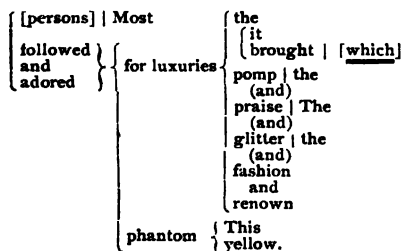
Myself, objective, subject of [*to be*].

Hoarse, predicate adjective, limiting *myself*.

Diagram:

"Most, for the luxuries it brought, the pomp,
The praise, the glitter, fashion, and renown,
This yellow phantom followed and adored."

J. A. H. STAGG.



[Vol. III, No. 2.]

- 1.
- It*
- took
- Rome*
- three hundred years
- to die*
- .

It is a pron., per., sim., its ant. is *to die*; 3d, sing., neut., nom., gram. subj. of "took."

Rome is obj. subj. of the infinitive *to die*.

To die is an infinitive, with the construction of a noun, the logical subject of *took*.

2. Much depends on who the commissioners were.

{ Much
depends | on { who
were commissioners | the

On is a prep., showing the relation of the interrogative sentence, *who the commissioners were to depends*.

3.

{ I
want { to be quiet
(and)
to be let alone.

To be quiet is an objective el. of the 2nd cl., of which *to be* is the copula and *quiet*, the attribute.

To be let alone is, also, an objective el. of the 2nd cl., of which *to be let* is the copula and *alone*, the attribute.

"I direct \$2000 be paid to my wife Lucy Stone and children."

C. A. S.

{ I
direct { (that)
\$2000 { to wife { my
{ [shall] be paid { and } Lucy Stone
[to] children | [my.]

This sentence is said to have been taken from a will, and the question is asked whether, since Lucy Stone is a second wife and has children by a first husband, it means to *my* children or to *her* children. This question would involve a study of the circumstances and evidence, and belongs to the court. But grammatically considered it must be *my* children. Omit *Lucy Stone* which is merely in apposition to wife and it reads *be paid to my wife and children*. This evidently means *my wife* and *my children*. I can not see how the word explaining *wife* affects *children*.

We have spoken only with reference to the laws of grammar.

NOTES AND QUERIES.

MATHEMATICS.

1. The gate of a sluice is 12 ft. deep and 20 ft. broad. What is the pressure of water against it? E. P. C.
2. How many solid ft. are there in a wedge whose base is 5 ft., 4 in. long and 9 in. wide, the length of the edge being 3 ft., 6 in., and the perpendicular height 2 ft., 4 in.? *Id.*
3. Whereabouts on the line between the earth and the moon, will the attraction of the earth be 16 times the attraction of the moon? Represent the mass of the moon by *c*, that of the earth by *b* and their distance apart by *a*. MIGNONETTE, Woodson, Ill.
4. What is the best method of stating questions in compound proportion? Does the rule of Cause and Effect apply to all? LIBRA.
5. When and by whom was the decimal point introduced? *Id.*
6. Is excellence in mathematics usually considered a test of general

mental power and capacity?

Id.

7. A teacher was to get \$25 for teaching 25 pupils but if he had 30 pupils he was to receive \$30. He had 29; how much should he receive?

F. W. BELL.

MISCELLANEOUS.

1. Why do we not have the first day of the year on Christmas?

J. J. KEITZ, *Pa.*

2. Give the name of the present rulers of all the countries of Europe?

T. A. PUGH.

3. What animals existed in the Tertiary Period?

Id.

GEOGRAPHY.

1. To what race do the Hindoos belong?

T. A. PUGH.

2. At what time of the year is the earth nearest the sun?

Id.

3. Give a rule to determine the length of a degree of longitude on any parallel.

Id.

ANSWERS.

1. [Vol. II, No. 10, Q. 16, p. 328.]

If the length of the hypotenuse of a right angled triangle be given, and the sum of the base and the altitude; how, according to arithmetic, not by algebra (as it is easy enough by algebra) can the lengths of the base and the altitude respectively be found?

Ans. $\frac{1}{2}(S \pm \sqrt{H^2 - S^2})$ = the legs of any right angled triangle. S = sum of the base and altitude and H = hypotenuse.

A. H. KENNEDY.

2. [Vol. II, No. 1, Q. 3, p. 21.]

A stone was dropped into a well. It was observed that after being dropped it was ten seconds before the sound reached the ear. What is the depth of the well?

Ans. A stone will fall at the rate of 16 ft. in one second and increase in a fourfold ratio.

The 1st term is 16, No. of terms 10, ratio 4, find the last term. 6th power
 $o f = 262144 \times 16 = 4194304$ ft., depth of the well.

H. C. ROGERS.

3. [Vol. III, No. 1, Q. 2, p. 21.]

Why do the inhabitants of a mountainous country always prize liberty so highly?

Ans. A mountainous region possesses a magnificence and sublimity of scenery nowhere else to be found; and magnificence and sublimity know no mean submission. The natural strongholds defy all power, and the very air is spirit-elating. The rushing streams, the deep and awful chasms, the towering forests, "Heaven's concentrated lightning, thunder and storms," the savage rocks and precipices, are all proclaimers of liberty.

M. A. GRUBER.

4. [Vol. III, No. 1, Q. 3, p. 21.]

Why do we hear sounds so much plainer when the air is damp?

Ans. Sound travels in water at a velocity of 4700 feet per second, and in air 1090 feet per second. Hence the more moisture the air contains the better medium of sound it is.

Id.

5. [Vol. III, No. 1, Q. 5, p. 21.]

Why is the rainbow always seen bent in the shape of a bow?

Ans. The deviations of the incident and emergent colored rays of the rain-drop of the primary bow are between $42^{\circ} 2'$ and $40^{\circ} 17'$. The *axis of the bow* is a straight line passing from the sun through the observer's place to the opposite point of the sky. Hence all the emergent rays meeting the eye of the observer must be equally inclined to the *axis of the bow*, which causes the bow to be circular.

Id.

6. [Vol. III, No. 1, Q. 1, p. 21.]

Who were the "Round heads," and why so called?

"Round head," in English History, is a nick-name given, in the reign of Charles I, to the Puritans, or Parliamentary party, who were accustomed to wear their hair cut close to the head. They were so called in opposition to the Cavaliers, or Royalists, who wore their hair in long ringlets. The term was soon extended in its application so as to include all the adherents of the parliament, whether Puritans or not. See Webster's Unabridged.

J. E. McMULLEN.

7. [Vol. III, No. 1, Q. 1, p. 21.]

I have some corn worth \$30. If the number of the bushels be added to the price per bushel, the sum will be $117\frac{1}{2}$. How many bushels have I and at what price per bushel?

Let x =no. bu.

$2\frac{1}{2}x$ — x =price per bu.

Then, $(2\frac{1}{2}x - x)x = 3000$ cts.

$x^2 - 2\frac{1}{2}x = -3000$

Complete sq. and ext. root $x=80$ or $37\frac{1}{2}$

And $2\frac{1}{2}x - x = 37\frac{1}{2}$ or 80

Ans. { 80 bushels at $37\frac{1}{2}$ cts. a bushel, or
 { $37\frac{1}{2}$ " " 80 " " "

MIGNONETTE, Woodson, III.

NOTES.

[Vol. II, No. 11, Q. 7, p. 368.]

S. A. Kagy, Findlay, O., in solving this problem, [Vol. III, No. 1, p. 22]. did not comply with the conditions of the problem. He simply found the *average* weight of the three sets of slabs; the weight of each set is, however, required.

As THE TEACHER desires brevity, I give the following concise and general solution of all problems of its kind:

Put R =radius of sphere.

(1) $\frac{4\pi R^3}{3}$ =vol. of sphere.

$\frac{2R\sqrt{3}}{3}$ =edge of cube.

(2) $\frac{8R^3\sqrt{3}}{9}$ =vol. of cube.

$$(1)-(2)+(6)=(3) \frac{2R^3(3\pi-2\sqrt{3})}{87}=\text{vol. of each slab of first set less 2 wedges.}^*$$

$$(4) \frac{2\pi R^3(9-4\sqrt{3})}{87}=\text{vol. of each slab of first set.}$$

$$(4)-(3)=(5) \frac{2R^3(6\pi-4\pi\sqrt{3}+2\sqrt{3})}{87}=\text{vol. of 2 wedges.}^*$$

$$1000+(1)\times(5)=(6) \frac{1000(3\pi-2\pi\sqrt{3}+\sqrt{3})}{9\pi}=9.4912+\text{oz.}=\text{Weight of 2 w'dgs.}^*$$

$$1000+(1)\times(4)=(7) \frac{1000(9-4\sqrt{3})}{18}=115.09982+\text{oz.}=\text{weight of each slab of first set.}$$

$$(7)-(6)=105.6086+\text{oz.}=\text{weight of each slab of second set.}$$

$$(7)-2(6)=96.1174+\text{oz.}=\text{weight of each slab of third set.}$$

*The term "wedge" is here used to denote that part of the sphere included between the two small exterior parts of any two of the dividing planes perpendicular to each other.

Leesport, Pa.

M. A. GRUBER.

EXAMINATION DEPARTMENT.

QUESTIONS PREPARED BY THE INDIANA STATE BOARD OF EDUCATION, FOR THE EXAMINATION OF TEACHERS IN MARCH, 1880.

WRITING.

1. In what respects does w differ from u? e from c? 2 pts., 5 each.
2. How many straight lines in x? What difference in their slant? 2 pts., 5 each.
3. Write ten words beginning each with a different capital. 10.
4. How many letters contain the loop or 4th principle? Write them. 10.
5. Write all the letters one space in high. All that are three spaces high. 10.

Let the penmanship of the candidate as shown in the answers to the above questions be marked from 1 to 50 according to the judgment of the Superintendent.

ORTHOGRAPHY.

1. Write a word containing a primary and a secondary accent. Designate the accented syllable. 10.
2. (a) How many sounds may ch. be used to represent? (b) Write a word to illustrate each. 2 pts., 5 each.
3. (a) Write the plural form of each of the following words:—foeman; dormouse; talisman; German; mussulman. (b) State the rule that governs the spelling of these words.
4. What is the meaning of the following abbreviations? viz.: vs.; vid.; Shak.; ob. 5 pts., 2 each.
5. Indicate the sounds used in the proper pronunciation of the following words:—equation; victuals. 2 pts., 5 each.

6. Spell correctly the following words:—hazzard; pettal; viscid; alleys; inveigle; nauceate; colar; alleys; catarh; referable. 10 pts., 5 each.

READING.

"Speak the speech, I pray you, as I pronounced to you, trippingly on the tongue; but if you mouth it, as many of our players do, I had as lief the town crier spake my lines." From *Hamlet*.

1. Who was the author of the above quotation? At what time and in what country did he live? 2 pts., 5 each.
2. What are the two most prominent ideas expressed before the first semicolon? Give the reasoning which leads to your conclusion. 2 pts., 5 each.
3. State the different ways in which emphasis can be expressed in oral reading. Give a sentence illustrating each. 2 pts., 5 each.
4. Indicate the sounds in the following words by the use of diacritical marks:—tongue; mouth; lief; pray; many. 5 pts., 2 each.
5. What would be the different steps in your progress in teaching the pupil to read this quotation? 10.

Let the candidate read a selection at sight, upon which he shall be marked according to the judgment of the Superintendent, from 1 to 50.

ARITHMETIC.

1. Define an integer, a problem, a concrete number, and an abstract number. 4 pts., 3 off for each omitted.
2. Write the following numbers in words:—700.007; .707; 231.800; 8000.0008; and 8008. 5 pt., 2 off for each om.
3. Define measure, weight, a simple number, and a compound number. 4 pt., 3 off for each omitted.
4. A man owns 13.5 A. of land. If he lays it out in village lots, each 5 by 8 rd., how many lots will he have? Proc. 5; ans. 5.
5. When it is 10 o'clock A. M. at St. Louis, it is 11 h., 20 min., 24 sec. A. M. at Portland, Me. What is the difference in longitude? Proc. 5; ans. 5.
6. What is the interest on \$1250 for 1 yr., 2 mo., 3 da., at 7 per cent? Proc. 5; ans. 5.
7. When gold was worth 130, what amount of currency could be bought for \$5,800 in gold? Proc. 5; ans. 5.
8. A man obtained \$4,500 at bank payable in 90 da., the discount being 8 per cent. per annum. What was the face of the note? Proc. 5; ans. 5.
9. Reduce 19200 milligrams to grams. Proc. 5; ans. 5.
10. Make a diagram of a Congressional township showing (a) the sections, and the (b) number of each section, according to U. S. rule. a=5; b=5.

GRAMMAR.

1. Write a sentence containing a relative pronoun referring to two subjects in the singular number taken conjointly and parse the verb in the subordinate clause. 2 pts., 5 each.

2. Correct,—“He should not venture into deep water that cannot swim,” and parse the relative. 2 pts., 5 each.
3. Analyze the corrected form of the sentence above given. 10.
4. What are the principal parts of a verb? Why so called? 2 pts., 5 each.
5. In the sentence, “He made him dismount,” parse “him” and “dismount.” 2 pts., 5 each.
6. Give two rules for using or omitting the article. 2 pts., 5 each.
7. Write a sentence in which a pronoun shall be in apposition with a pronoun and parse the appositive pronoun. 2 pts., 5 each.
8. “John,” says I, “mind your pease and qs.—Correct. 10.
9. “Let every one attend to their own business.” Correct and parse “let.” 2 pts., 5 each.
10. Write ten words usually used as conjunctions. 1 off for each error.

GEOGRAPHY.

1. What is the difference, in Geography, between a small circle and a great circle? Name one of each. 3 pts., 4, 3, 3.
2. What is an ocean current? What is the most important ocean current known? Beginning at the Gulf of Guinea trace it through one circuit. 3 pts., 3, 2, 5.
3. Name five conditions upon which climate depends. 5 pts., 2 each.
4. What is the difference in direction between the two highland districts of N. America? Into what two great bodies of water, one north and one south, are the low centre regions of N. America drained? 3 pts., 4, 3, 3.
5. What is the form of government of the U. States? Name the departments of the general government. Into what branches is one of these divided? 5 pts., 2 each.
6. Name the states constituting the Middle States. By what other names are two of them frequently called? 3 pts., 6, 2, 2.
7. In what part of the U. States is mining most largely carried on? Why? 2 pts., 5 each.
8. What country in S. America has no capital? What state in the U. States has two capitals? 2 pts., 5 each.
9. What mountains separate France from Spain? What, Russia from Turkey, in Europe? 2 pts., 5 each.
10. Fill the following blanks: 10 pts., 1 each.

States in	Wheat.	Corn.	Tobacco.	Sugar.	Peaches.
which each					
is produced.					

HISTORY.

1. Who were John and Sebastian Cabot? 10.
2. (a) By whom, and (b) in whose reign were the first attempts to settle Virginia? a=6; b=4.
3. What was the principal voyage of La Salle within the U. S.? 10.

4. (a) When and (b) by whom was Washington first appointed Commander-in-Chief? a=3; b=7.
 5. What States first adopted the present U. S. Constitution? 10.
 6. What were some effects of the Embargo of 1807? 10.
 7. What were two notable events in Monroe's administration? 2 pts., 5 each.
 8. What occasioned the debate between Hayne and Webster, 1832? 10.
 9. What was Nullification in South Carolina, 1832? 10.
 10. For what was Jackson distinguished as President? 10.
- NOTE.—Narratives and descriptions should not in any case exceed six lines.

PHYSIOLOGY.

1. How many bones are there in the spinal column? How are they joined? What are the advantages of this kind of articulation? 3 pts., 3, 3, 4.
2. What is the function of the synovial membranes? What is that of their secretions? 2 pts., 5 each.
3. Give two uses of the muscles. 2 pts., 5 each.
4. How many pairs of salivary glands are there? What is the effect of mastication upon the secretion of these glands? 2 pts., 5 each.
5. What organ secretes the bile? What, the pancreatic juice? 2 pts., 5 each.
6. Why does the system require more food in winter than in summer? 10.
7. What changes occur in the food in the intestines? 10.
8. Why is the heart double? What is the function of each part? 2 pts., 5 each.
9. Why should active exercise not be taken immediately before or immediately after eating? 2 pts., 5 each.
10. Why should school rooms be well ventilated? 10.

THEORY AND PRACTICE.

1. What are the advantages of the written method of teaching spelling? Give two. 2 pts., 10 each.
2. Why is self government on the part of the pupil the ultimate object of school government? 20.
3. Why should a recitation thoroughly test the pupil's knowledge? 20.
4. Give two directions respecting the assigning of lessons. 2 pts., 10 each.
5. To what extent may a teacher use a text-book in conducting recitations? 20.

ANSWERS TO STATE BOARD QUESTIONS, FOR MARCH, 1880.

IN SPECIAL CHARGE OF ANNIE M. SHERRILL.

The Number of the Answer Corresponds to the Number of the Question.

ORTHOGRAPHY.

1. In 'defat'igable.
2. Three. *ch* (unmarked), as in child. *ch*, *soft*, like *sh*, as in chaise. *ch*, *hard*, like *k*, as in chorus.

3. (a) Foemen; dormice; talismans; Germans; Mussulmans; (b) In such words as foeman, and dormouse the plural is distinguished from the singular only by a change of the vowel or vowel sound of the word; words which end in the syllable *man*, and are not compounds, form their plurals regularly, by adding *s* only.

4. (*Versus*), Against, or in opposition; (*Vide.*) See.; Shakespeare, Shakspeare, or Shakspeare; (Obit.) Died.

5. E-qua'shun; Vit-lz.

6. Hazard; petal; viscid; alleys; inveigle; nauseate; collar; catarrh; ref-er-able.

READING.

1. William Shakespeare. In England from 1564-1616.

2. He had shown them how to speak it and he wished them to speak it as he had shown them. The ideas are distinctly expressed.

3. Emphasis may be given by an increase of Force or Stress, by a change in Quality, Form, Pitch, or Movement, or by a change in the combination of two or more of these attributes. Examples:—Emphasis of Force; The repose of the soul is *exercise*, not rest; Emphasis of Stress: "*Tried and convicted traitor!*" Who says this? Emphasis of Quality: And then I cried for *vengeance*; Emphasis of Pitch: Then "*Fire! fire! fire!*" on ship-board. Emphasis of Movement: Not among the prisoners—*Missing!* That was all the message said. *Prof. Hamill.*

5. 1. Teach the pronunciation and meaning of the words. 2. Have pupils read so as to bring out the ideas of the passage.

ARITHMETIC.

1. An integer is a number which expresses whole things; a problem is a question requiring solution; a concrete number is one that is used in connection with some specified thing; an abstract number is one which is not used in connection with any specified thing.

2. Seven hundred, and seven thousandths; seven hundred and seven thousandths; two hundred and thirty one, and eight hundred thousandths; eight thousand, and eight ten-thousandths; eight thousand and eight.

3. Measure is that by which extent, dimension, or quantity of matter is ascertained, whether it be length, breadth, thickness, or amount.—*French.* Weight is the measure of the amount of matter or the quantity of heaviness in a body.—*French.* A simple number is an abstract number, or a concrete number having but one denomination. A compound number is one consisting of two or more concrete numbers having different denominations.

4. $13.5 \times 160 = 2160 = \text{no. sq. rd. in } 13.5 \text{ Acres.}$

$5 \times 8 = 40 = \text{no. sq. rd. in each lot.}$

In 2160 sq. rd. there are as many lots as 40 is contained times in 2160, which are 54. Therefore he will have 54 lots.

5.	hr.	min.	sec.
	11	20	24
	10		

1 20 24 = dif. of time.

1 hr. 20 min. 24 sec. $\times 15$ = dif. of long. = $20^{\circ} 6'$.

6. Int. on \$1250 for 1 yr. at 7% = \$87.50

" for 2 mo. = $\frac{1}{6}$ of \$87.50 = $14.58\frac{1}{2}$

" " 3 da. = $\frac{1}{12}$ " " = $.72\frac{1}{4}$

" entire time = \$102.81 $\frac{1}{4}$

7. When one dollar in gold is worth 130 cents, \$5,800 in gold = 5800 times 130 cents = 754000 cents = \$7540.00. Therefore, \$7540 of currency can be bought for \$5800 of gold when gold is worth 130 cents to the dollar.

8. Process: $1 - .0206\frac{2}{3} = .9793\frac{1}{3}$ = the proceeds of \$1.

\$4500 $\times .9793\frac{1}{3}$ = \$4594.99+ = the face of the note.

Analysis: Since the proceeds of \$1 are $.9793\frac{1}{3}$, \$4500 are the proceeds of as many dollars as $.9793\frac{1}{3}$ is contained times in \$4500, which is \$4594.99+. Therefore the face of the note is \$4594.99+.

9. In 1 milligram there is .001 of a gram. In 19200 milligrams there are 19200 times .001 which are 19.2 grams. Therefore in 19200 milligrams there are 19.2 grams.

10.

6	90	68	51	34	17
88	5	4	3	2	1
89	86	87	65	66	48
8	8	9	10	11	12
84	85	64	47	30	13
82	83	62	63	45	46
18	17	16	15	14	13
80	81	61	44	27	10
78	79	59	60	42	43
19	20	21	22	23	24
76	77	58	41	24	7
74	75	56	57	39	40
30	29	28	27	26	25
72	73	55	38	21	4
70	71	53	54	36	37
31	32	33	34	35	36
69	52	35	18	1	

For further discussion of this subject see article on Rectangular Surveying, in Dec. number, 1879.

GRAMMAR.

1. The man and boy *who* passed our house were afterward seen in town. *Passed*, verb, reg., intrans., active, indic., 3d, plural, to agree with subj. man and boy. R. The verb must agree with its subject in person and number.

2. He *who* can not swim should not venture into deep water. *Who*, pro., rel., ant. 'he,' with which it agrees in 3d, sing., mas. R. Pronouns must agree with their ant. in person, num. and gender. Nom. case, subj. of can swim. R.

3. '*He who can not swim should not venture into deep water*' is a complex declarative sentence, of which '*he who can not swim*' is the complex subject, of which '*he*' is the simple subject, modified by '*who can not swim*,' a simple adjective element of the third class. It is also a simple declarative subordinate sentence, of which '*who*' is the simple subject, unmodified, also the subordinate connective, and '*can not swim*' the complex predicate of which '*can swim*' is the simple predicate, modified by '*not*' a simple adverbial element of the first class. '*Should not venture into deep water*' is the complex predicate of the leading sentence, of which '*should venture*' is the simple predicate, modified by '*not*' a simple adverbial element of the first class and '*into deep water*' a complex adverbial element of the second class, of which '*water*' the noun of the base is modified by '*deep*' a simple adjective element of the first class.

4. The Principal Parts of a verb are the Present Indicative Active, Past Indicative Active, and Past Participle. These are called principal parts because from them all other forms of the verb are made.—*Holbrook*.

5. '*Him*' is a pronoun, personal, ant., person spoken of, with which it agrees in 3d, sing., mas., objective subject of infinitive [to] dismount. [*To*] dismount verb, reg., intrans., act., infinitive mode, construction of a noun object of '*made*.'

6. No article is used when we refer chiefly to the nature of the object, to the class generally, or to only a part indefinitely; also when the substantive is sufficiently definite itself, or is rendered so by other words.—*Kerl*.

7. I saw him fall, him of the sable plume. *Him*, pro., personal, ant. person spoken of, with which it agrees in 3d, sing., mas., obj. case, in apposition with *him* as first used.

8. "John," says I, "mind your p's and q's."

9. Let every one attend to his own business. Let is a verb, irreg., trans., active, 1m., 2nd, sing., to agree with subject thou or you understood.

10. And, but, or, nor, either, neither, till, until, as, and before.

GEOGRAPHY.

1. Great circles divide the earth into two equal hemispheres. Small circles divide it into unequal hemispheres. The equator and meridians are examples of great circles and the tropics are examples of small circles. —

2. A portion of the water of the ocean moving in a given direction and bearing the same relation to the surrounding water as the river does to the land. The Gulf Stream is the most important Ocean Current. Coming from the Antarctic Ocean along the west coast of Africa a cold current, its course changes at the Gulf of Guinea and it becomes the Equatorial Current setting toward the Caribbean Sea and Gulf of Mexico from which it issues under the name of the Gulf Stream, a warm current flowing northeasterly across the Atlantic and striking the British Isles and continuing toward Norway and Sweden and is lost in the Arctic Ocean. Opposite Cape St. Roque it divides, the southern branch following the Coast of Brazil and then turning east across the Atlantic completes the circuit at the Gulf of Guinea. It divides again opposite New Foundland the southern branch continuing towards the Straits of Gibraltar and turning south joins the Equatorial Current at the Gulf of Guinea, completing the circuit. The main stream which is lost in the Arctic Ocean returns along the coast of Labrador as a cold current and flows underneath the Gulf Stream until it reaches the Equatorial region.

3. Latitude, altitude, diversities in the surface of the land, nature of the soil, influence of ocean currents.

4. The western highland district extends from north west to south east; the eastern extends from north east to south west. The southern low center region is drained into the Gulf of Mexico the northern into Arctic Ocean.

5. The government of the U. S. is republican in form. It is sometimes called a Federal Democratic Republic. The departments of the general government are, the legislative, the executive and the judicial. The legislative department is composed of a Senate and House of Representatives.

6. New York, New Jersey, Pennsylvania, and Delaware. New York, is called the Empire State, and Pennsylvania is called the Keystone State.

7. In the Rocky Mountain Regions, because of the greater amount of mineral wealth. It would be difficult, however, to tell whether there is more labor employed in mining the precious metals and other minerals from the western mountains than is employed in getting out the coal and iron of Pennsylvania and Virginia.

8. Patagonia. Rhode Island.

9. Pyrenees. Caucasus.

10.

<i>Wheat.</i>	<i>Corn.</i>	<i>Tobacco.</i>	<i>Sugar.</i>	<i>Panches.</i>
Iowa.	Illinois.	Virginia.	Louisiana.	New Jersey.
California.	Iowa.	Tennessee.	Florida.	Delaware.
Illinois.	Missouri.	Kentucky.		Maryland.
Ohio.	Ohio.	Maryland.		
Wisconsin.	Indiana.	North Carolina.		

HISTORY.

1. John Cabot was a Venetian merchant of Bristol, England. He was commissioned by Henry VII to sail on a voyage of discovery and take possession of all new lands in the name of England. In 1497 he discov-

tered the coast of Labrador. After his return Sebastian, his son, sailed for the purpose of discovering a north-west passage to China. He was compelled to turn south by the ice, and explored the coast as far as Albemarle Sound. He made several other voyages to the New World.

2. Sir Walter Raleigh in the reign of Queen Elizabeth.

3. Hearing the news of Marquette's discoveries, La Salle inspired with a passion for exploration built and launched a ship above Niagara Falls and sailed through Lake Erie, Lake Huron and Lake Michigan to the mouth of the St. Joseph R. which he ascended a little way and from thence traversed the country to the Kankakee R. which he descended to the Illinois R. and floated down its current until overtaken with disaster he was obliged to return on foot to Fort Frontenac a distance of one thousand miles. In 1681 he returned to the point on the Illinois descended that stream to the Mississippi and floated on its broad bosom to the Gulf of Mexico.

4. On the 15th of June, 1775 Washington's nomination as Commander-in-chief was confirmed by the Continental Congress assembled at Philadelphia. His name had been presented by John Adams.

5. Delaware first, Pennsylvania next, followed by New Jersey, Georgia, Connecticut, Massachusetts, Maryland, South Carolina and New Hampshire making the nine which were necessary by its own terms. The other states finally adopted it, Rhode Island being the last.

6. The object of the Embargo Act was to compel France and Great Britain to recognize the rights of American neutrality. This it sought to do by cutting off commercial intercourse with these nations. It was the object of much ridicule and was of little avail except to injure American commerce. It was repealed 14 months after its passage.

7. Missouri Compromise and Cession of Florida to U. S. by Spain.

8. The Nullification Act of South Carolina.

9. The high protective tariff being distasteful to the people of the South the state of South Carolina passed an act declaring the tariff laws "null and void." This was known as the Nullification Act.

10. Jackson was distinguished as President for his honesty and firmness of disposition.

PHYSIOLOGY.

1. The spinal column consists of 24 bones joined together by cartilages. The advantages of this kind of articulation is that the bones are not easily injured by shocks as the cartilages act as cushions.

2. The synovial membranes secrete and contain the synovia which lubricates the joints giving them freedom of motion without friction.

3. To produce motion, and to hold the limbs in position.

4. There are three pairs of salivary glands, the parotid, the submaxillary, and the sublingual. The act of mastication excites these glands and causes them to secrete the saliva.

5. The liver secretes the bile and the pancreas the pancreatic juice.

6. The system requires more food in winter than in summer because food is necessary to keep up the animal heat.

7. The chyme is converted into chyle, the albuminous portions of the food being digested by the pancreatic and intestinal fluid and the fatty portions dissolved by the bile.

8. The heart is double because it has a double office to perform, the right side that of receiving venous or impure blood and sending it to the lungs, and the left side of receiving arterial or pure blood and distributing it to the system.

9. Active exercise should not be taken immediately before or after eating because the energies of the system are needed for the digestion of the food.

10. School-rooms should be well ventilated because containing so many persons the air soon becomes very impure and needs frequent renewal or the health of the inmates is affected.

THEORY AND PRACTICE.

1. We form a picture of the word in the mind by seeing it written and the impression is much stronger than if the letters are merely repeated. The *act* of writing the word tends to cause the mind to remember it.

2. Because when this end is attained the efforts of the teacher are no longer needed.

3. The recitation should be a test of the pupil's knowledge so that the teacher may know how to assign future lessons and be guided in his future instruction.

4. Always give a preliminary drill directing the pupils how to study their lessons. Do not assign so many pages of the book but announce the subjects or topics and request pupils to find out what they can wherever they can.

5. When examples are to be assigned from the text book or when the recitation consists of exercises as reading, spelling, parsing, &c., the teacher may use the book, also in preliminary drills when he wishes to show the pupil how to use the book.

THE aptness of ignorance to generalize from insufficient data, to jump at conclusions, to put effect for cause and cause for effect, is a matter of daily observation. In past ages it has been the parent of superstition, the incentive to mistaken zeal and heartless cruelty. It has darkened the lives of men and of nations, drenched the fairest lands in blood, disgraced the holiest places, effaced the most honored memories, sacrificed innocence, crowned brutality, deified lust and vice, put a premium on ignorance and hypocrisy, filled the pages of history with records of shame and their margins with borders of mourning.—*Sydney G. Cooke, School Commissioner, Wayne Co., New York.*

COLLEGE DEPARTMENT.

DEVOTED TO THE INTERESTS OF THE CENTRAL NORMAL,
DANVILLE, INDIANA.

CONDUCTED BY G. DALLAS LIND.

DEAR FRIENDS:—Normalites continue to increase in numbers. We can only repeat what we said last month with a little more emphasis. The third term is about closing and everybody is unusually busy. Next term there will be by far the largest attendance ever known in the history of the Normal. Prof. Hamill has begun his work in Elocution and a royal work he is doing. His method of teaching is superior and he is a *master* of the Science. He does not teach by imitation but analyzes every expression and movement and drills the pupils individually and collectively in the principles of the Science.

Dr. Tingley's steam engine and lathes are in running order and the work of manufacturing apparatus for the use of teachers has begun. All persons who are here and expect to conduct schools especially of the higher grades will go away provided with sets of apparatus which will have cost them but little and which will be of incalculable value to them in their school work.

T. E. Littel, Epsom, Ind., says "if my health improves I will add a *Littel* to the list of students next term." Come on, we have room for a *Littel* more.

Ada Kelsey writes from Areola, Ill. She says, "I was not long in school but it was long enough to make me wish to come back to finish my education. I do not mean by *finish* that I would stop altogether, for I think we can learn as long as we live."

J. C. Colin is at Milltown, Ind. His school has closed and he is engaged to teach at the same place again for next winter.

D. B. Sherry, Scientific of 1879, has just closed a successful school and is now with us for the rest of the year.

Chas. Beeson is at home, (Centreville, Ind.), working on the farm, but will be back to the Normal next year.

Belle Burkheart is teaching at Rockport, Ind.; Carrie Lyon at Goodland, Ind.; J. A. Lambert at Daleville, Ind.; Eva Halstead at Rensselaer, Ind.

We have had two enjoyable Reunions this term, one managed by the girls, the other by the boys, but the girls came out best as they always do.

S. M. Weddel, (Medora, Ind.), has just closed a successful term and engaged the same school for next winter. Will act as Life Insurance agent this summer.

Miranda Scott writes from Preston Ohio, "I can not tell of work in the school room but I have found Normal principles to be valuable in the home and social circle."

M. F. Baldwin, our historical map-maker, has gone home to conduct a summer Normal in Grant Co. In addition to the map advertised in other columns he has nearly completed a map of the Administrations including the War of 1812, the Mexican War, and the Great Civil War. These maps represent an immense amount of study and research, and will be of inestimable value to the student and teacher of history.

Some time ago it was announced that Prof. J. H. Steele, of Lebanon, O., would commence teaching in the Central Normal College next September. Owing to the rapidly increasing numbers, arrangements have been made for him to begin teaching Apr. 20. This is a good move for the Normal.

Prof. A. C. Hopkins, of state reputation as a musician and mathematician will have charge of vocal music in the Normal this summer. He is a prince of musicians.

We give below the whereabouts of a few Normalites:

Jennie M. Bishop,	Altamont, Ill.
J. W. Thompson, Jr.,	Lizton, Ind.
G. M. Dodd,	Tunnelton, Ind.
Melinda Wimmer,	Bellmore, Ind.
E. M. Watkins,	Palmyra, Ind.
C. F. Hamilton,	Fletcher, Ohio.
Lina Hinks,	North Liberty, Ind.
Maggie J. Nelson,	Hayesville, Ohio.
Mollie King,	Milroy, Ind.
J. B. Nichols,	Albion, Ill.
C. J. Webster,	South Whitley, Ind.
H. C. Redman,	Owensville, Ind.
Jim B. Doyle,	Lebanon, Ind.
J. C. Bridges,	Ann Arbor, Mich.
O. C. Carr,	Raleigh, Ind.
M. J. La Rose,	Hoovers, Ind.
Nelson Grimes,	Coatsville, Ind.
J. W. Trotter,	North Salem, Ind.
E. Nannie Owen,	Fowler, Ind.
Frank Phillips,	Paris Crossing, Ind.
Mollie Mitchell,	Clayton, Ind.

EVERY one of our readers should send 10 cents for copy of the *Agent's Herald*, or send postal card for descriptive circulars of "Imitation Stained Glass." The latter is cheap and beautiful for school houses, churches, and private residences. In copy of *Agent's Herald* you will find it fully described, price and instructions for applying it. Address, L. Lum Smith, 1511 Sampson St., Philadelphia, Pa.

PUBLISHER'S DEPARTMENT.

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IF you want to make money *now, right now*, take an agency for our books.

THE CENTRAL NORMAL COLLEGE, Danville, Ind., is the best place to obtain a normal education.

IN sending us money be sure not to send stamps in amounts of over one dollar. 1-cent stamps preferred.

IT will pay you to mention THE NORMAL TEACHER in every letter you write to advertisers. It will insure a prompt and careful filling of your order.

Z. B. WEST and J. H. Kramer, both former students of the Central Normal, are to open a Normal School at Fairfield, Ill., May 3d. They are sure to have success, because they merit it.

WE are now appointing agents by the scores every day for all of our publications. We must have one in every county in the U. S. before July 1st. Let those who desire an agency write us at once.

WE print a very large issue of this number, and many copies will reach persons who are not subscribers. We hope all such will read carefully the entire magazine, and especially the advertisements of our publications and let us know at once if they can accept an agency.

WE desire to call special attention to all of our new advertisements. They are all reliable. Please read every one of them and in answering any of them be careful to mention THE NORMAL TEACHER. By so doing you will greatly oblige both the advertiser and ourselves.

WE are out ahead of time this month, but we hope that none of our readers will find fault with us. "It is better to be too early than too late" you know. The June number may not be out before June 10, or 15. We hope that our readers will not get impatient if they do not receive it before June 15th.

OUR subscription list is still largely on the increase. If we keep on at our present rate of daily increase we will have the largest circulation of any school journal in the U. S., by June 1. We hope all of our friends will try to send us in one new subscriber at least before June 1. You can do it easy enough if you only try. *How many will try?* Let us hear from all of you.

THE CENTRAL NORMAL COLLEGE is having a "boom," as they call it. It is rapidly increasing in numbers and next term will enroll more students than any two terms within the history of the Institution. We desire to repeat what we said last month, that every person who thinks of attending school should investigate the merits of this school before going elsewhere.

PROF. S. S. HAMILL is creating great excitement in his classes in Elocution at the Central Normal College. It is not too late to enter these classes. One month's instruction in Elocution under Prof. Hamill will be worth more to a teacher than it will cost him for a whole term at the Normal. Let our readers bear this fact in mind before they start to a Normal School.

TO SUBSCRIBERS one and all we would say: The receipt of your subscription will be acknowledged only, by sending the journal regularly to your address and should you at any time change, please notify us, giving your new as well as old address. A blue mark signifies that your subscription expires with this number, and we would respectfully ask you to renew, so as not to miss a single number. However, if you do not need THE NORMAL TEACHER any longer, *we heartily thank you for what you have done*, and very reluctantly bid you good bye.

IT pays to take an agency for our books. One agent says: "Sold nine copies of Normal Question Book and ten of Methods of Teaching in Country Schools in about an hour this morning." Another agent says: "Never saw books that sell like yours. I propose to canvass all summer and fall. In fact will make it a business if you will give me sufficient territory." And so the story goes. We could fill a book with such notices as the above. We hope every one who is out of employment will apply at once for terms and territory. We can give ten thousand energetic men and women employment *now*. Write us at once and secure choice of territory.

AS OUR mailing lists are made out from the 20th to the 30th of each month our subscribers will bear in mind that no requests should be sent us during this time to change the P. O. address. Either write us before the 20th of the month or wait until after the 30th. If, in the meantime you should change your location you must write the P. M. to forward your mail. Another fact right here is worth a statement. The late postal guides say that all mail matter of the first, second and third classes upon which one full rate of postage has been paid (which is always the case with such matter as this journal) shall be forwarded at the request of the person addressed. Most Postmasters do not know this, not because it is not their business to know it, but because they do not read their Guides. We hope that all our readers who asked for a change of postoffice address for April number about the time we were making out our mailing lists and who have not yet received their magazine will *not write to us* but to their former Postmaster and have it forwarded to them. If necessary send stamp to prepay postage or take the pains to teach him a little law.

WE offer better inducements to canvassers on our books than any publisher and offer a greater variety of premiums than any school journal and can make it decidedly to the advantage of all who wish to work for any publishing house to consult our terms and premium circular sent free on application.

THE NORMAL TEACHER is the most original as well as the most practical school journal in the world. We can say this without boasting. It is so pronounced by all its readers. Please note the fact, that while there is no other school journal which does not have one or more articles selected from other journals and many of them are made up almost altogether of selections, THE NORMAL TEACHER has no selections except brief paragraphs which are choice gems culled from the writings of our greatest educators. The matter is always new, fresh and original. Many journals copy our articles entire because they are practical and pointed and publish them as their own without giving credit, while others make extracts from them and give only part of the name of the contributor and not the name of the TEACHER, so as to hide the appearance of plagiarism but which nevertheless is such.

WE take pleasure in copying the following notice from the *Hendricks County Union*, issue of April 8th. It speaks for itself: "The Central Normal College is well provided with teachers now in the special departments. Dr. Tingley is devoting his attention to the natural sciences, and paying special attention to the manufacture of cheap, simple, but valuable apparatus. His ability to turn out such is wonderful, and his instruction how to make the same is very valuable. Prof. Hamill is creating a great interest in elocution. The Professor has few equals in his work and is devoted to it, and is successful in making good speakers. Many persons, who have taken lessons from him, have procured good situations at good salaries in the same work. Prof. Hamill will give private lessons a part of his time. Now is the time to profit by his instructions. The Normal is fortunate in having these two distinguished men connected with it. Teachers from abroad should note this and come to Danville at once. It will pay."

S. L. MORROW & Co., Indianapolis, are offering agents the most liberal terms on their New Illustrated Indiana History, Historical Bibles, Voter's Text-Book, and other standard works.

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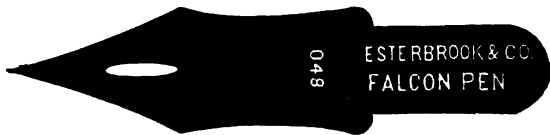
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THE NORMAL TEACHER.

 VOL. III.

DANVILLE, IND., JUNE, 1880.

 No. 4.

TALKS ON ELOCUTION.—NO. IV.

 G. WALTER DALE.

In coming before my audience this time I do so with a subject which is of the greatest interest to me and which I should be glad to have all the teachers before me investigate carefully. I speak of CONVERSATION. The application of Elocution in this department of its use is its most beautiful as well as its most generally useful sphere. Where do we find one who can say that Elocution, or a knowledge of it, would be of no practical benefit when we consider its importance in conversation alone? Conversation is made up of three requirements, namely: What to Say; When to Say It; and How to Say It. The first of these requirements shall be our theme in this "Talk." How shall we know "What to Say?" This is the question that you ask me first and I shall answer by saying that you find out what to say by reading, thinking and acute observation. Read omnivorously. That is the only kind of reading that will fit you in the broadest sense to converse well. Think closely upon what you read and make application of your knowledge whenever opportunity offers. Observe the habits of people and study to avoid their vanities and conceits while you absorb and adopt their excellences. Strive to avoid

imitation but when you see something you should like to use remodel it to suit your peculiar personality. You cannot successfully wear another person's shoes because while the size may correspond with your own and the general outline of feet the same, details differ. As entities we differ thus, so that what exists as an excellence in one, becomes a misfit or farce in another, when merely transplanted. You can scarcely imagine a more fruitful source of general culture than is afforded in the course of reading and study necessary in learning what to say in conversation.

Thought is necessary to enrich our knowledge and impress the memory. Thought is the digestive process of mental alimentary economy, and mental dyspepsia the evil that follows thoughtless reading. I have thought so frequently of the need of some systematic putting of this important subject that I have been tempted into the projection of a book on conversation. Every teacher has need of this accomplishment and in order to teach Elocution well it is doubly essential as being the legitimate corner stone of all Elocutionary work. There is a kind of flatness and frivolity about the conversation of the average social circle that amounts to poverty of thought resource. Two extremes are to be avoided namely too prosy a conversation and too frivolous. A proper admixture is best. This will be developed further as the next themes are taken up. Read the best magazines for general culture and novels of good authorship for small talk. Miscellaneousness of knowledge is indispensable. A good many teachers are not able to afford the expense necessary to the highest development and I suggest—although hardly in the scope of this "Talk"—that you form reading clubs in your neighborhoods where by means of a co-operative plan of subscription and circulation you can come in contact with the choicest literature at nominal cost. Cheap editions of all leading works are to be had and no teacher or community in our day can with justice claim excuse for ignorance. The study may lessen your opportunities of whiling time in idle pursuits as many learn

to do, and delight in, but if you have the ring of the true metal in you, you will be glad to spend one or two evenings per week in self-improvement. I have in contemplation a plan for supplying material to country reading clubs which will be explained in the "Talks" as soon as it assumes tangible shape. I am anxious to lend such aid as I may be able, to those who are ambitious to excel. Let me hint here that much of your abstract knowledge is unavailable, and while you think you know it, to all practical purposes and intents you do not. Whenever you cannot call up for use anything you know, in case of a need of it you might as well not know it at all.

Again, too many have only vague forms of expressing what they know; that is, what they have learned. We may only be said to *know* a thing when we can use it on any occasion. Conversation improves us much in this direction when we really know any thing. There is a great need now for general culture. Allow me the criticism, teachers, too many of you have merely a technical education. Take you outside of the absolute requirements of your business and you do not, as a rule, talk well. Why? because you have not had any general culture; that comes to you only in the ways I have recited in the early portion of this "Talk" as qualifying us in knowing *What to Say*.

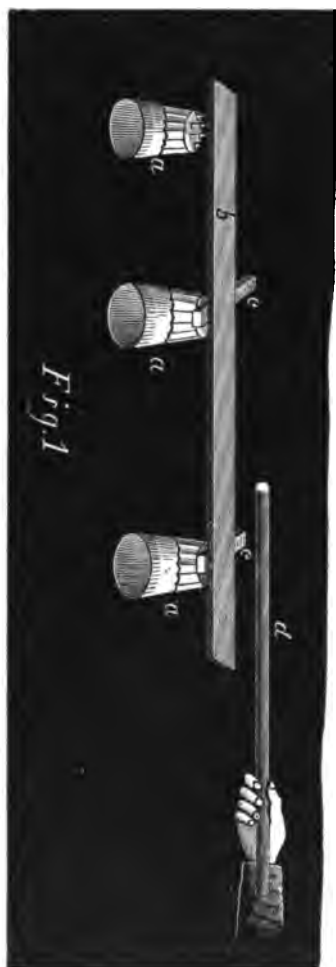
There is no excuse for this state of affairs when you know the need of it. You are only responsible when you are shown the lack and neglect to supply it. The benefits derived from this course of mental training are for all time and applicable in all walks of life.

It is time to close this "Talk" and I hope to address you next on *When to Say It*, once you have learned *What to Say*. With my sincere acknowledgements for your appreciative attention I make my best bow and retire.

THE primary principle of education is the determination of the pupil to self-activity—the doing nothing for him which he is able to do for himself.—*Sir William Hamilton.*

ELECTRIC EXPERIMENTS.

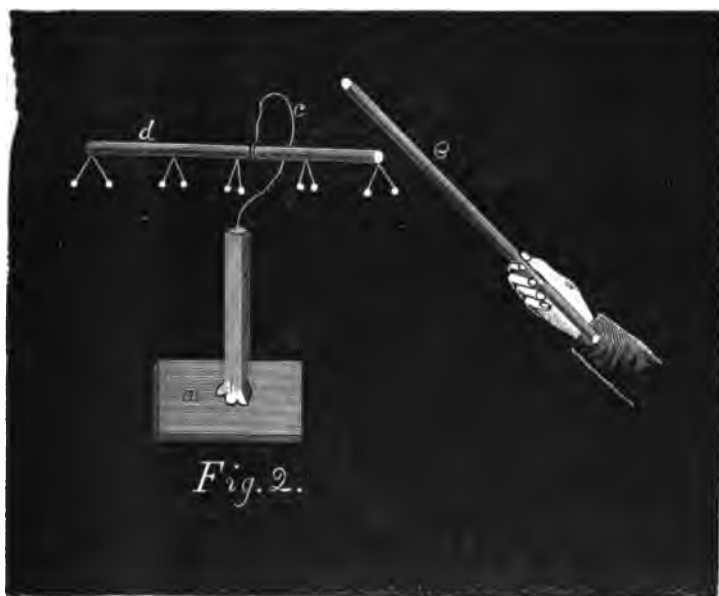
J. E. BAKER.



Electric Induction—Lath.—Support a lath or yard stick upon two tumblers; placing pieces of sealing-wax between each tumbler and the lath so that the insulation shall be

complete. Place a third tumbler, bottom upward, under one end of the lath, putting upon the tumbler some small pieces of tissue paper or pith which should be nearly an inch from the lath. Now bring a rubbed glass tube *near* the other end of the lath. The bits of paper will at once leap up to the lath showing that the lath is electrified, not by contact of the tube, but merely by its influence.

Electrifying any substance by bringing an electrified body *near* it without touching is called *induction*; i. e. electricity is *induced* by the presence of an electrified body. The presence of the rubbed tube separates or decomposes the electricities of the lath and according to the law of electric action the positive electricity of the tube attracts the negative of the lath to the end near the tube and repels the positive to the end near the bits of paper. No electricity is *communicated* to the lath, only the constituents of its own separated. When the tube is removed the positive and negative electricities commingle and become neutral.



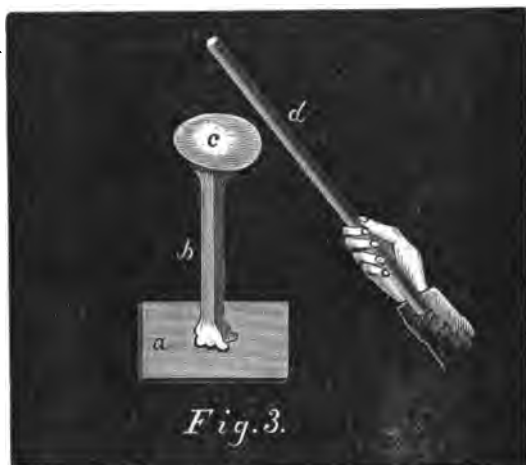
Electric Induction—Pith balls.—Stick a piece of sealing-

wax, upright, to a small board (piece of chalk box). Heat one end of a wire, six or eight inches long, and plunge it in the end of the wax so that the wire will stand vertical. Bend two or three inches of the upper end of the wire at right angles. Make a wooden rod nine or 10 inches long and half an inch in thickness covering it with tin-foil. Now attach it to the wire so that it will be in a horizontal position. Suspend from this horizontal rod three pairs of pith balls, one pair at each end and one in the center of the rod. In suspending the balls use cotton or linen thread and of such length that the balls shall be about an inch and a half from the rod. This kind of apparatus is spoken of by nearly every text-book in illustrating electric induction. Now bring a rubbed glass tube *near* one end of the rod and the pairs of balls at the ends of the rod will diverge but the pair in the center will remain undisturbed.

By the *influence* of the excited tube, or in other words by *induction*, the electricities of the rod are decomposed or separated, the negative being attracted to the end nearest the tube, the positive being repelled to the end farthest from the tube according to the law of attraction and repulsion. The pair on the end nearest the tube receive the negative of the rod and diverge; the pair on other end receive or are charged with positive and become divergent also. The center of the rod contains a neutral point and hence the central pair are not disturbed. As before stated there is no electricity transmitted to the wooden rod; the action being only temporary as the balls will collapse after removing the tube.

Carrier or Proof-plane.—This instrument is used to carry electricity from some electrified body to an electroscope. A simple form is given in Tyndall's *Lessons in Electricity*, Fig. 15; also, *Avery's Natural Philosophy*, Fig. 158. One may be made by simply gluing a small piece of gilt paper or tin-foil upon the end of a stick of sealing-wax. Using the wax as the handle, the electrified body is touched by the foil which becomes charged with the same electricity as the electrified body. Now while the foil is thus charged bring

it near the knob of an electroscope when the leaves will diverge; or bring it near a suspended pith ball when the presence of electricity will be proven by the attraction of the ball. This instrument will be used in the following experiment:



Electric Induction—Insulated Egg.—Fasten an egg (or an apple, turnip or potato) sideways upon a stick of sealing-wax a small piece of board. Bring the rubbed glass tube *near* one end of the egg. According to the theory the electricities are separated, the negative attracted to the end of the egg near the tube and the positive repelled to the end farthest away. Removing the tube they again mingle. If the egg is now touched with the carrier, then the electroscope, no effect is produced showing conclusively that they have mingled and become neutral. Again bring the tube *near* the egg and at the same time touch the end of the egg farthest from the tube with the carrier, then the electroscope and the leaves diverge. Repeat, and with the carrier touch the end of the egg near the tube and convey it to the electroscope, the leaves again diverge.

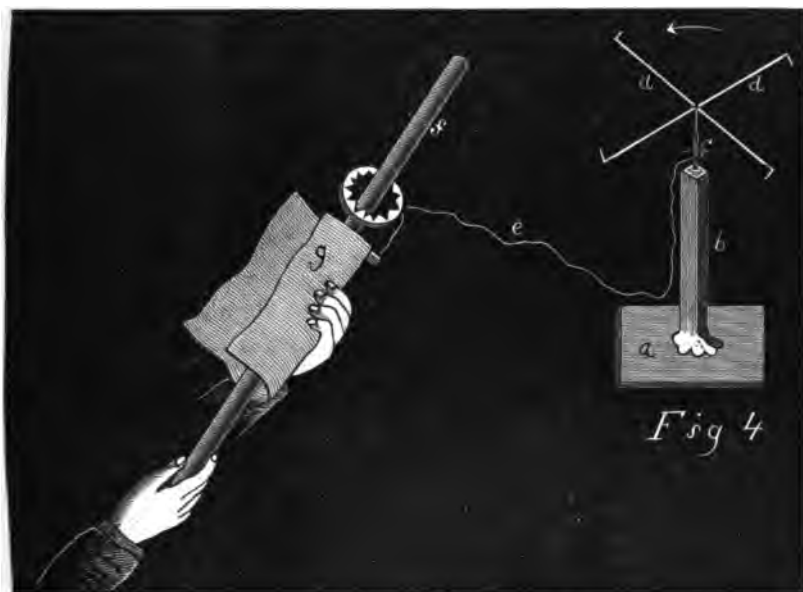
It can be easily proven (see *Positive* and *Negative*, April No.) that the electricity from the end of the egg farthest away from the tube is positive and that of the other, nega-

tive which proves the theory nicely. Thirdly, while the rubbed tube is held *near* one end of the egg touch the other end with the finger which removes all the positive; prove this by touching it with the carrier, then the electroscope, when there will be no manifestation, proving that the positive has been removed by the finger. The negative remains at the end near the tube. Prove it by touching the end with carrier, then the electroscope, causing divergence. When the tube is removed the negative diffuses itself over the entire egg which can easily be proven by the carrier and electroscope.

This easy and striking experiment given by Prof. Tyndall proves the logic of the theory to be without a flaw. By Induction the electricities are separated and with a little careful manipulation they are handled with as much certainty and precision as the carpenter does his square.

Distribution—Sphere and Box.—Support a wooden sphere covered with tin-foil on a stick of sealing-wax. Bring the rubbed tube against it several times so that it becomes well charged. Touch it with the foil of the carrier and transfer the charge to the electroscope, and observe the extent of the divergence. Discharge the electroscope by touching the knob, and repeat the experiment, touching this time other places of the sphere, the divergence will be the same. Repeat several times and it will soon be apparent that the electricity is equally distributed over the surface of the sphere. *Not so*, however, with any body with corners or sharp points. To show this difference in distribution support a chalk or cigar box covered with tin-foil on a stick of sealing-wax. Charge it well as in the case of the sphere. Touch the side of the box with the carrier and then the electroscope; *note the extent* of the divergence. Discharge the electroscope and charge box again and touch the corner with the carrier, then the electroscope; the divergence will be greater showing that the corners impart a stronger charge to the carrier than the sides.

Very careful manipulation in this experiment is necessary to distinguish the difference in the divergency. The following experiment proves more conclusively that the electricity gathers at sharp points and there escapes or has a tendency to escape in the air:



Action of Points—Electric Mill.—Place a stick of sealing-wax upright on a small board. Procure some large and small straws. Take a straw with a very small aperture so a pin will work in it easily. Cut from this small straw a piece about three-quarters of an inch long, and from such a part of the straw that one end of the three-quarter-inch piece will contain a joint. Heat the upper end of the sealing-wax and push the joint end of the straw into the melted wax. Now take a larger straw about seven inches long and run a pin through its center, then drop the pin in the vertical straw of the wax and we have a delicately balanced straw. Pass a fine wire (copper, best) through the straw so that it will protrude at each end of the straw nearly an inch. These ends must be bent at right angles with the straw so

that they shall point, not upwards or downwards, but sideways and in *opposite* directions. Now loosely connect one end of a small copper wire with the small vertical straw, bending the wire so that it will descend along side the stick of wax; connect the other end of the wire with Cottrell's Rubber. Now work the rubber and electricity will be transmitted along the wire to the straw *which should be very delicately balanced*. The straw now revolves rapidly. From the fact that electricity accumulates on sharp corners and points, it gathers on the sharp ends of the bent arms and escapes, electrifying the air with the same electricity; hence we have repulsion and hence the revolution of the balanced straw.

This experiment is very attractive and will elicit and rivet the attention of any mind. No teacher should fail to try it, he will equally be absorbed in its *modus operandi*. Two straws can be arranged and placed across each other. It is in this form that the Mill is generally described, but it is best to try it with one straw first. Instead of the wire forming the bent arms, sewing needles can be placed in the ends of the straws answering just as well, *provided* the straws be dampened.

Amalgam.—The efficacy of the silk pad or rubber is greatly increased by the application of what is called amalgam. Persons who experiment much in frictional electricity always have a supply of this material on hand. It can be purchased for a trifle from any philosophical instrument maker. It can, however, be made for *less money* besides enjoying the privilege of its manufacture unless a person's indolence is in excess of his industry. Take one part by weight of tin-foil, two parts of zinc, and six of mercury. Put the tin-foil and zinc in an iron ladle or crucible and hold it over a hot fire till it melts (fire at blacksmith's shop is best). When melted pour in the mercury after which pour the entire mixture into a cigar box previously rubbed with chalk inside. Shake the mixture till cool and hard. Pulverize a portion and mix it with lard and smear on the silk rubber.

It is surprising to note the difference it makes in the exciting power of the silk.

EXPLANATION OF FIGURES.

Fig. 1 is for experiment, Electric Induction—Lath. *a a* aim to represent tumblers, bottom upwards. *c c* sticks of sealing-wax lying on two tumblers. *e* bits of tissue paper. *b* a lath or yard stick. *d* glass tube *near* the lath. The figure is similar to Fig. 14 in Tyndall's Lessons in Electricity, except tumbler and wax.

Fig. 2 belongs to experiment, Electric Induction—Pith-balls. *a* is a small board. *b* stick of sealing-wax. *c* wire. *d* is a horizontal tube with five pairs of pith-balls suspended, those at the end are most divergent, the middle ones are together, the other two pairs are *partly* divergent. *e* glass tube *near* the end of wooden rod. A similar figure may be seen in any philosophy except this has the home-made appearance.

Fig. 3 belongs to Electric Induction—Egg. *a* is a wooden base same as preceding. *b* sealing-wax. *c* an egg. *d* glass tube. Similar to Fig. 16 in Tyndall's Lessons in Electricity.

Fig. 4 belongs to Action of Points—Electric Mill. *a* and *b* board and sealing-wax. *c* a small short straw. *d* straws with wires at ends. *e* wire connecting the *little* straw with Cottrell's Rubber. *f* glass tube. *g* is the silk pad.

I CONSIDER a human soul without education like marble in the quarry, which shows none of its inherent beauties, until the skill of the polisher fetches out the colors, makes the surface shine, and discovers every ornamental cloud, spot, and vein, that runs through the body of it.—*Addison*.

EVERY day is a little life: and our whole life is but a day repeated; whence it is that Jacob numbers his life by days; and Moses desires to be taught this point of holy arithmetic, to number not his years but his days. Those, therefore, that dare lose a day, are dangerously prodigal; those that dare misspend it desperate.—*Bishop Hall*.

A FEW QUESTIONS FOR TEACHERS TO ANSWER.

T. BAGOT.

1. Do we teach our pupils to think and form conclusions for themselves, or do we do their thinking for them and feed them with the results of our own investigation? thereby teaching them to rely upon us, instead of upon themselves, and depriving them of that confidence in themselves which is so essential to success in life.

2. Do we require them to explain the different parts of the subjects over which they pass, or do we make the explanations and simply require them to answer "yes" or "no" as they understand, or fail to understand what we are endeavoring to expound to them? In this way, locking up their imperfect ideas in their own minds and laying the foundation for inability to express themselves lucidly on any subject.

3. Do we compel them to be thorough in what they pass over, or do we content ourselves with *believing* they understand it, without taking the necessary pains to *ascertain* whether they do or not?

4. Is our teaching systematic, and are we sure that our pupils have a classified knowledge of the studies they are pursuing, or do we simply burden them with a lot of isolated facts, without any regard to their relation to one another?

5. Do we give questions in regular order and suited to the grade of the pupils, or do we persist in puzzling them with difficult questions, or trifling with those belonging to lower grades which we know they can answer readily?

6. Do we extend our studies beyond the narrow limits of the text-book and teach our pupils that the book belongs to the subject upon which it is written, instead of the subjects belonging to the book, or do we content ourselves with the examples and propositions laid down by the author, regard-

less of the associations and comparisons which it is our duty to make?

7. Do we study our pupils as well as our books and adapt our rules and methods to the peculiar disposition of each one, or do we make an iron bedstead of these rules and methods and cut all our pupils to fit it, disregarding the diversity of traits and propensities that may exist among them?

8. In our general conduct, both in school and out, do we set our pupils an example worthy of imitation, or are we guilty of doing or saying things for which we would punish them? Do we appear neat, orderly, polite, and indicate to them the way that they should go by going in that direction ourselves?

9. Do we endeavor to educate our pupils intellectually, morally, physically, or do we pay all our attention to their intellectual advancement and close our eyes and ears to the fact that the ultimate success of every individual must stand upon the great tripod of intellectual, moral and physical development, and that the omission of any one of these three great factors destroys the utility of the remaining ones?

10. In fine, are our methods of instruction, our rules and regulations, our precepts and example such as tend to the normal development of the faculties of our pupils, and to prepare them for the business of life and the duties of good citizens and good men?

If you love learning, you will have learning.—*Greek Proverb.*

THERE are many things which ought to be taught in our public schools that we now ignore. In every school in the farming districts there should be a system of book-keeping adapted to farm accounts, practically illustrated and so simple in its theories that it would fill the necessities of every farmer, who ought not to be afraid of figures.

CORRESPONDENCE.

INTEREST.

Editor Normal Teacher:

In former articles I have developed this subject only with reference to one of its elements. I will now bring out the other three.

Interest as all know is the product of the principal, modified by the time in years, and the rate *per year*.^o Or to formulate it

$$I = P \times T \times R.$$

From the above equations we have three other formulas, viz:

$$P = \frac{I}{T \times R}$$

$$T = \frac{I}{P \times R}$$

$$R = \frac{I}{P \times T}.$$

With these formulas in mind we may easily work any problem in interest without reference to the book rules, which are clumsy and being at least four in number perplex the pupil's memory.

I will now proceed to work four examples, illustrating two methods of finding each of the four elements of interest.

In practice I use only the "formula method" as I term it, but I introduce a statement by cause and effect to show their identity and from whence the formula is really derived.

I call your serious attention to this method of dealing with interest questions, as it is undoubtedly superior to all others.

1. Interest on \$500 for 18 months at 8% per year?

First by the formula $I = P \times T \times R$.

	500 Prin.
12	18 Time in years.
100	8 Rate per year.

| \$60 Int.

Now the same by cause and effect.

E {	× Int.	500 Prin.	} C
		18 Time.	
		100 Rate.	
C {	1 Prin.	Int. $\frac{8}{100}$	} E
	1 yr.		
	$\frac{18}{100}$ Rate		

	500
12	18
100	8

| 60 Int.

It will be observed that after making the statement by cause and effect, and resetting the terms below for cancellation I have the identical arrangement as resulted from the formula in the first method.

The cancellation is supposed to be understood.

2. What principal on interest 18 months at 8% per year will produce \$60 interest?

First by the formula $P = \frac{I}{T \times R}$

$$\begin{array}{r|l} 18 & 60 \\ 8 & 12 \\ & 100 \end{array}$$

| \$500 Prin.

Now by cause and effect.

$$\begin{array}{l} C \left\{ \begin{array}{l} \times \text{ Prin.} \\ \frac{18}{12} \text{ years.} \\ \frac{8}{100} \text{ Rate.} \end{array} \right. \end{array} \quad \begin{array}{r|l} & 60 \text{ Int. E.} \\ & \$1 \text{ Prin.} \\ & 1 \text{ year.} \\ & \frac{8}{100} \text{ Rate.} \end{array} \left. \vphantom{\begin{array}{l} C \\ E \end{array}} \right\} C$$

$$\begin{array}{r|l} 18 & 60 \\ 8 & 12 \\ & 100 \end{array}$$

| \$500 Prin.

The $\frac{18}{12}$ being on both sides of the line destroy each other.

3. In what time will \$500 produce \$60 at 8% per year?

First by the formula $T = \frac{I}{P \times R}$

$$\begin{array}{r|l} 500 & 60 \\ 8 & 100 \end{array}$$

| 1½ years.

Now by cause and effect which resolves it into the same form.

$$\begin{array}{l} C \left\{ \begin{array}{l} 500 \text{ Prin.} \\ \times \text{ Years.} \\ \frac{8}{100} \text{ Rate.} \end{array} \right. \end{array} \quad \begin{array}{r|l} & 60 \text{ Int. E.} \\ & \$1 \text{ Prin.} \\ & 1 \text{ Year.} \\ & \frac{8}{100} \text{ Rate.} \end{array} \left. \vphantom{\begin{array}{l} C \\ E \end{array}} \right\} C$$

$$\begin{array}{r|l} 500 & 60 \\ 8 & 100 \end{array}$$

| 1½ Years or 18 mos.

As in all examples I leave the simple matter of cancelling across the line to my readers.

4. At what rate % will \$500 produce \$60 in 18 months?

First by formula $R = \frac{I}{P \times T}$

$$\begin{array}{r|l} 500 & 60 \\ 18 & 12 \\ \times & 100 \\ \hline & 8\% \text{ Rate.} \end{array}$$

It will be necessary in the formula method of finding the rate to always put 100 at the right, as the rate is always so many cents.

Now by cause and effect.

$$\begin{array}{r|l} \begin{array}{l} C \left\{ \begin{array}{l} 500 \\ 18 \\ \times \\ 100 \end{array} \right. \\ E \times \\ 100 \end{array} & \begin{array}{l} 60 E \\ \\ \\ \left. \begin{array}{l} 1 \\ 1 \\ \times \\ 100 \end{array} \right\} C \end{array} \\ \hline \begin{array}{r|l} 500 & 60 \\ 18 & 12 \\ \times & 100 \\ \hline \end{array} & \end{array}$$

| 8% as before.

T. H. ROSE.

DISCOUNT.

Editor Normal Teacher:

Permit me to ask a true answer to 7th problem in the September number of THE NORMAL TEACHER. I see by referring to page 214 Sept. No. that there is a mistake in finding face of note, or that Indiana's bankers do not work by same rule as do Ohio bankers.

Is not D. M. Beck correct? I find before me three different solutions; first as found in Sept. No., page 214, ans. \$.175 found by getting present worth of \$468, according to rule for *True Discount*=\$463.366. Then finding simple interest on this sum for 63 days at $5\frac{1}{2}\%$ =\$4.45989 added to present worth=\$467.825 face of note. I think this wrong because the face of a note payable at bank and upon which proceeds have been drawn is found by dividing net proceeds \$463.366 by proceeds of \$1.00 for 63 days at $5\frac{1}{2}\%$, which is \$.990375=\$467.869, and this deducted from \$468=\$.131 as also found by Mr. Beck.

I also have another solution by *Ohio talent* who claim that the way to ascertain true am't to be drawn from bank is by getting simple interest on \$468 for 60 days=\$4.68. Then \$468.-\$4.68=\$463.32 as am't due merchant, and this am't divided by (\$.990375) will give true face of note \$467.82+.

Now, what we wish to know is, how many kinds of discount are recognized by our standard authors. Ray and Stoddard both say two,—True and

Bank Discount. White says there is such a thing as *Business discount, sometimes*; but the question is, what is true all the time? Discount is an abatement for payment of a debt before it is due, and that the sum to be paid after deducting this abatement is the present worth. Now \$463.32 will not amount to \$468.00 in 60 days at 6%, but instead will amount to \$467.953 which does not prove and is therefore incorrect.

Clinton, O.

H. A. H.

SOLUTION OF PROBLEM.

Editor Normal Teacher:

In THE NORMAL TEACHER [Vol. II, No. 12, p. 405, Q. 3,] I find the following by J. C. Gregg:

What is the *least* number which divided by 28, 19, and 15, will leave the remainders 19, 15, and 11, respectively?

Solution: $28+19=47$ will satisfy the first condition. Dividing 47 by 19, the remainder is 9, which is 6 less than the required remainder; hence we must add to 47 a number which, divided by 19, will leave a remainder of 6, and the number added must be a multiple of 28. 196 is the least multiple of 28 that will contain 19, with a remainder of 6. Then $47+196=243$ satisfies the first two conditions. Dividing 243 by 15, the remainder is 3, which is 8 less than the required remainder; hence we must add to 243 a number which divided by 15 will leave a remainder of 8, and the number added must be a multiple of 28 and 19. The least multiple of 28 and 19 is 532, which must be multiplied by 14 to get a remainder of 8. $532 \times 14 = 7448$.

$243+7448=7691$. Ans.

Cleves, Hamilton Co., O.

W. B. J.

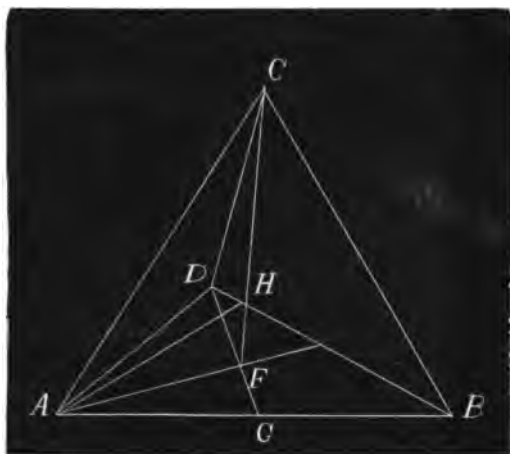
SOME CRITICISMS.

Editor Normal Teacher:

I am quite sorry to know that Mr. Reubelt takes umbrage at my poor little arithmetical puzzles. I am sorry that he thinks me "impertinent" and I am sorriest of all to think that he has failed—completely failed—to solve them. I submitted them to *him*, because I saw his name in your column of Mathematics, and thought he would enjoy the same fun in solving them that I did. He says that if he thought that I thought he could not solve them, he would not try. It does not matter to me whether he tries them or not; and since I have seen his "demonstration" of the "four ball" problem, I guess it will be best for him not to try. I, at first, supposed that he would solve them and publish a neat solution of them, but now I very much fear that he can not solve them. When he says they are solved by "obscure formulæ" he simply gives himself away. As to their not being the worth the time and pains necessary to solve them,—that depends upon the amount of time and pains necessary for *him* to solve them, which I am ready to believe would be considerable. But, Mr. Editor, I want to give you a plain, solid and simple solution of the "four ball" problem.

I shall do it entirely by the principle of the right-angled triangle, and shall not refer to Geometry, Trigonometry or anything that even Mr. R. cannot understand.

Solution: It is evident that the lines joining the centers of the four balls will form a regular tetra-edron each of whose edges is equal to the diameter of the balls.



Each side of the tetraedron will be an equilateral triangle whose sides will each be 3.5 inches. Now, to save unnecessary trouble, let us call the radius of the balls a .

Let a = radius of the balls = 1.75 in. = AG , or AD , then easily AE or DG = $a\sqrt{3}$ and AF = $2a\sqrt{3}$. Then in the triangle ACF knowing AC and AF , we find CF = $2a\sqrt{6}$. And $2a\sqrt{6} + 2a$ = the height of the pile. Restoring the value of a we get 6.3577 inches.

Again, it is evident that the lines (not shown in the figure) joining the points of contact of the *little* ball with the four large ones, will form a smaller tetraedron, whose center coincides with the center of the large one, at H . It is easily proved that $HF = \frac{1}{4} CF$. Then in the triangle $A FH$, $AF = 2a\sqrt{3}$

$HF = \frac{1}{4} CF = \frac{a\sqrt{6}}{2}$ and we find $AH = \frac{a\sqrt{6}}{2}$. Then $\frac{a\sqrt{6}}{2} - a$ = the radius of the small ball. Restoring the value of a we have $\frac{a\sqrt{6}}{2} - a = .3933$ inches. See?

Now let's look at one of the problems I submitted to Mr. R. (I have forgotten what the other is):

What is the *least* number which divided by 28, 19, and 15 will leave the respective remainders 19, 15, and 11?

The least number which divided by 28 will leave 19 is evidently 47. Now $47+19$ leaves a remainder of 9. The next least number which divided by 28 will leave 19, must be 75; and $75+19$ leaves 18. Add 28 again (to 75) and we get 103. $103+19$ leaves 8. Add 28 to 103=131. $131+19$ leaves 17. Now let's look at our remainders. Here they are, 9, 18, 8, 17; do you see the funny law? Let's pursue it till we find the desired remainder, thus: 9, 18, 8, 17, 7, 16, 6, 15, and as each remainder indicates 28 to be added we must add 28×4 or 112 to 131 and we have 243, which fills the first *two* conditions but gives a remainder of 3 when divided by 15. So we must pursue our first series of remainders to 15 again. Here goes, 15, 5, 14, 4, 13, 3, 12, 2, 11, 1, 10, 0, 9, 18, 8, 17, 7, 16, 6, 15, and we find we must add 28×19 to 243=775 $775+15$ leaves 10. Again we must add 532 and we get 1307, which divided by 15 leaves 2. Add 532 again and we get 1839. Divide by 15 and the remainder is 9. Now let us look at this series of remainders. Here they are, 3, 10, 2, 9. Again the same law prevails, and we must pursue it till we find the remainder 11. Here we go; 9, 1, 8, 0, 7, 14, 6, 13, 5, 12, 4, 11. This shows that we must add 532 eleven times, or 5852. Then $1839+5852=7691$, ans. Now, Mr. Editor, I submit to you whether this is a queer and interesting solution. It is my own too, and I may as well say that I felt considerably elated when I discovered it. This solution will solve any similar example, or show its impossibility. I would like all your readers to try this example, and if there is any other arithmetical solution I would like to see it. I am fain to hope that Prof. Reubelt will admit that this solution is worth careful perusal.

I desire to notice Mr. Schneider's solution in the April No. of THE NORMAL TEACHER. I am one of those who believe that the simplest solution is always the best. I think Mr. S. has almost destroyed the beauty of the equations by his very complicated solution. The following is preferable, in my judgment:

$$\begin{aligned}x^2+y^2 &= 35 \\x^2+y^2 &= 13\end{aligned}$$

Let $x+y=s$

and $xy=p$

then $x^2+y^2=s^2-2p$

and $x^2+y^2=s^2-2p$

$$\therefore s^2-2p=35$$

$$s^2-2p=13$$

multiply (1) by 2 and we have $2s^2-4p=70$ (3)

multiply (2) by 3s and we get $3s^2-6ps=39s$ (4)

$$2s^2-6ps=70 \quad (3)$$

$$s^2=39s-70 \text{ by subtracting it.}$$

$$s^2-8=39s-78 \text{ by subtracting 8 from each side.}$$

By factoring, $s^2-8=39(s-2)$

dividing by $s-2$: $s^2+2s+4=39$

by subtracting 3, $s^2+2s+1=36$

by extracting sq. root, $s+1=6$

$$s=5 \text{ or } -7 \text{ or } 2$$

$$\text{and } p=6 \text{ or } 18 \text{ or } -4\frac{1}{2}$$

Restoring $x+y=5$ or 2 or -7

and $xy=6$ or $-4\frac{1}{2}$ or 18 .

We find the same roots given by Mr. Schneider. In a similar manner who will solve $x^2+y^2=11$ It can be done.

$$x^2+y^2=7?$$

Who can solve these equations?

$$x^2y+xy^2=820$$

$$x^2-y^2=9.$$

J. C. GREGG

EDITORIAL NOTES.

THERE is a class of teachers so devoid of originality or inventive genius that however much they might be trained they would go out mere imitators, doing and saying what they had seen and heard, in a very mechanical way. The teacher who cannot from his own resources make plans and methods will never be successful. But the 'born' teacher, in whom we most emphatically believe, would profit doubly from the training school. He is all alive to hints and suggestions which find lodgment with him for future development. *He gets at the principles* of education, which are the *soul* of methods. It is no mere surface work with him. Soul moves his work.

THE teacher must feel a responsibility for the spirit, methods and attainments of all his pupils. He will be obliged to take his pupils as he finds them; but he has fallen far short of duty if he leaves them so. If they are idle it is his duty to see that they become studious. If pupils come to the recitation unprepared, the responsibility is on the teacher to see that this thing does not continue long. When a teacher says that his pupils are idle, and are not attentive at recitation, he exposes his inability as a teacher, rather than their lack as pupils. The teacher's true work is to take idle, thoughtless pupils and bring them to a better standard of thinking and doing.

THAT education is development, that the mental, moral, and physical nature must be developed in harmony and unison, are foundation facts of the 'coming' system of education. But to get these principles evolved into tangible forms and methods which can be grasped and manipulated by our teachers, is the problem upon which the greatest of minds are bent and upon which the mind of every true teacher should be bent. "The attentive study and observation of the natural workings of the mind in the successive stages of its progress from incipient intelligence to maturity of reason, imply, not merely a careful analysis of the facts and modes of mental action, but a watchful observation with a view to detect in all cases, the moving power or *impelling principle* of action, to aid and regulate which is the educator's chief work."

MAY we hope that our educational machinery will ever be in such shape as to sift out and use only the best material in the market as teachers? At present any County Superintendent would find great difficulty in supplying his schools all with trained or experienced teachers. He is compelled to tolerate the indifferent, and when the trustee or director comes out with his authority, bent on employing the very cheapest man he can get hold of, the very poorest of the poor ones which are thus tolerated, naturally get the work. We look for the educational millenium to come when induce-

ments are held out such as will make a large number of choice spirits fit and equip themselves for teaching. In the East, where greatest advancement in education would be expected, and where greatest culture is supposed to exist, most roteism and rutism prevail. While there is more system, it represents no more philosophy than do the ways and means of more unsettled provinces. Time will make great changes. If men's minds can be kept constantly directed in the channel of education, philosophy of teaching and the needs of the profession, rapid strides will be made.

SPEAKING of the lack of knowledge on these points at this day, Prof. Barnard says: "Contrary, however, to the obvious suggestions of fact, education is still too generally regarded as existing, during its earlier stages, in arbitrary exercises of memory on combinations of printed characters, abstract numbers, or even the metaphysical relations involved in the science of Grammar. The excuse offered for a blind following of precedent in this direction usually is, the peculiar susceptibility of memory, during the period of childhood, and the comparative difficulty experienced in attempts to cultivate it at a later stage. Were the educational cultivation of memory directed to the retaining and treasuring up of those stores of knowledge which are naturally accessible to the mind of childhood, within the range of its daily observation, the plea would be justifiable; man's endeavors would be in harmony with the obvious instincts and endowments of the mind, and would tend to its natural expansion and development. But, directed to the mechanical and arbitrary results at which these endeavors so generally aim, their influence is detrimental. Their immediate effect is to quench the natural thirst for knowledge, to create a distaste for intellectual activity, and thus to defeat the best purposes of education. The law of true culture lies in the primary craving of the young mind for material upon which the understanding may operate; digesting it in due season into the regular form of knowledge which memory loves to retain, and which judgment ultimately builds up into the systematic arrangements of science."

It matters much whether the knowledge which would inspire to doing the right thing at the right time and in the right manner exists in the teacher. How few teachers, comparatively, understand the laws of the mind and growth of childhood and are able to supply the proper source and measure of activity at the various stages of unfolding or development, modified as this supply should be by a knowledge of the temperament, physical strength, &c., of each youthful subject. Ah, school teaching, as it *should* be, is a science requiring such knowledge and skill that if proper requirements were made for admission into the profession, what a swarm of 'flies' would be shut out. These qualifications would be *in general* about three. First, wholesome, common sense. This a vastly comprehensive term. It requires a fine, strong nature, strung to all the subtle harmonies. Like as the perfection of art hides all art, so in the display of common sense, which looks so plain and simple, many hidden cords are manipulated. The sec-

ond qualification would be a thorough training in the *principles and methods* of teaching. We think these could probably best be learned in connection. And the third qualification would be a knowledge of the branches or subjects to be taught. Our provisions for the instruction of teachers, and superintendence of the common schools should be such as to reduce our 'regular practicing' teachers as nearly as possible and as soon as possible to this grade. Common sense is an indispensable thing, but what woman would trust the material for a rich garment to an unskilled apprentice, trained neither in hand nor taste. The family physician must be skilled in his profession, or believed to be, but what about a wrong diagnosis of the case of the child at school? There is great danger (and is not the danger just as vital?) that at some critical time the wrong dose will be given or given in wrong quantities. Roger Ascham wrote in "The Schoolmaster" (the earliest work in the language upon education), in regard to this empirical teaching: "Surely long experience doth profit much, but most, and almost only to him that is diligently instructed with precepts of well doing. For good precepts of learning be the eyes of the mind to look wisely before a man, which way to go right, and which not. Learning (the recorded experience of others), teacheth more in one year than experience in twenty; and learning teacheth safely, when experience maketh more miserable than wise."

THE Philadelphia *Ledger* thus justly criticises modern teaching: "Our system of school-teaching, as it stands now, is based upon 'text-books.' Nearly everything is made to conform to the exigencies of the books. 'Studying' and 'recitations,' 'questions' and 'answers,' merit-marks for accurate memorizing, and demerit-marks for inaccuracies,—all from the books,—these make up the greater part of what is called 'teaching.' But there is just next to nothing worthy of the name of 'teaching' about it. Yet this is not the fault of those who occupy the positions of teachers. It is the fault of the system, which is built upon 'text books,' and made to conform to the trade in 'text-books,' and is primarily the fault of those who do the legislation for our school system, who seem to have no capacity for substituting a system of real teaching of knowledge that will be useful to pupils in their after lives, in place of the effect system of memorizing and parrot-like repetitions of 'words' and forms from 'text books,' which do not reach the understanding, and most of which are forgotten in a few weeks or a few days. We have known little creatures to be stranded for twenty-four months in one of the classes of a primary, simply because they had not the faculty to commit words to memory, and repeat them as answers to questions, although they were apt enough to learn when 'taught' in another way."

SEE to the health of your pupils. Look after the water they drink, see that all take some exercise at recess, and be careful to keep the school-room well ventilated.

GRAMMAR DEPARTMENT.

BY F. P. ADAMS.

Think for thyself—one good idea, but known to be thine own,
Is better than a thousand gleaned from fields by others sown.

{ [thou] }
 { Think } { for thyself }
 { [because] }
 { idea } { one } { good } { but } { to be [idea] } { thine }
 { known } { to be } { own }
 { is better } { (than) }
 { [ideas] } { a } { thousand }
 { [are good] } { gleaned } { from fields } { sown } { by [person] } { others. }

Jesus loves *even* me.

Even is a modal adverb, modifies *love*.

I *even* I *only* am left.

Even, modal adv., mod. *am left*.

Only is an adj. limits *I*.

Seest thou a man wise in his own conceit? There is more hope of a fool than of him.

{ thou }
 { Seest | man } { a }
 { wise | in conceit } { his }
 { own? }
 { (There) }
 { hope } { more } { (than) }
 { is } { of a fool } { [hope] } { of him }
 { is }

Not many generations ago where you now sit the rank thistle nodded in the wind.

{ thistle } { the }
 { rank }
 { nodded } { [at] generations } { many | not }
 { you } { ago }
 { sit } { now }
 { where }
 { in wind | the }
 { (There) }
 { limit } { a }
 { forbearance }
 { ceases to be virtue | a }
 { at which }
 { is }

It haunts me still, though *many a* year has fled *like* some wild *melody*.

{ It }
 { haunts } { me }
 { still }
 { (though) }
 { [year] many a }
 { has fled | like melody } { some }
 { wild. }

Many a is an adj., lim. *year*.

Like is a prep., shows the relation of *melody* to *has fled*.

Melody is the object of *like*.

NOTES AND QUERIES.

MATHEMATICS.

1. When is an equation said to be affected? T. A. PUGH.
2. A borrows a sum of money at 4% per annum, and pays the interest at the end of the year. He lends it out at the rate of 5% per annum, and receives the interest half-yearly. By this means he gains \$100 a year. How much does he borrow? *Id.*
3. If a heavy sphere, whose diameter is 4 inches, be dropped into a conical glass full of water, whose diameter is 5 inches and altitude 6 inches, how much water will run over? "MIGNONETTE," Woodson, III.
4. A flag-staff is broken in a storm 10 ft. from the ground. When the top strikes the ground the upper portion is again broken at such a point that the top piece is as long as the stump plus $\frac{3}{4}$ of the middle piece, and the middle piece is as long as the other two. How long was the staff before the storm? By analysis. LIBRA.
5. A can do a piece of work in 40 days, B in 60 days. After both work 3 days, A leaves. When must he return that the work may occupy but 30 days? F. W. BELL.
6. I have a three cornered lot which contains an acre: each of three sides is equal. What is the length of one side? If possible, by arithmetic. J. M. SIEGWORTH.
7. How large is the side of a cubical box that can be made from a plank $42\frac{1}{4}$ ft. in length, 24 in. wide, and 3 in. thick? Full solution desired. J. J. REITZ.
8. What is the value of x in the following: $29x^2 + 5x = 276$? Explain. *Id.*
9. $x^2 + y^2 = 35$
 $x^2 + y^2 = 13$. Find x and y. D. C. JONES.

GRAMMAR.

1. Analyze and parse italicized words:
All that John wanted was to get what belonged to him.

HARVEY BLEDSOE.

GEOGRAPHY.

1. What is the difference between a state and a territory? URIAH DANIELS.
2. Why is the period of time of the turning of the earth on its axis divided into twenty-four parts called hours? Why not twenty or thirty?
3. Why is the earth inclined twenty-three and one-half degrees, and what would be the effect were it more or less?
4. Why is it six months night and six months day at either poles alternately, and cause of it?
5. Why is it that the days are the shortest when the sun is nearest to the earth, and longest when the sun is farthest away? Cause of the same?

6. Why does the storm at or near the equinox come from the west in the spring and from the east in the autumn? Cause of the storm?

MISCELLANEOUS.

1. What is meant by "the sinking fund?" J. M. SIEGWORTH.
2. What meaning has the interrogation point enclosed in a parenthesis, thus (?) when used in an otherwise unbroken sentence? *Id.*
3. How were our names, such as Cook, Brown, Sherrill, Adams, &c., derived? *Id.*
4. If the mouth of the Mississippi is two and a half miles farther from the earth's center than its source, why does it run up hill?

ELIAS CRANE.

5. What government has the District of Columbia and what representation (if any) in the National Congress? THOMPSON VAUGHN.

ANSWERS.

1. It is required to enclose a piece of ground with a fence 10 rails high, 2 pannels to the rod, and to have just as many acres enclosed as there are rails in the fence. What will be the size of the enclosure, and what number of rails will it require?

Ans. Reduce one acre to the lowest given denomination, divide it by the given number, and multiply the quotient by 4, for the side of the square. In this problem the lowest denomination is twentieths of a rod and the given number is one of these twentieths; for there are to be as many acres in the field as there are twentieths of a rod in the circumscribing lines. $160 \times 20 = 3200$ twentieths of a rod in one acre and a strip $\frac{1}{10}$ wide and $2\frac{3}{4}$ long will equal one acre. Then $3200 \times 4 = 12800$ rods, or 40 miles, side of square and $12800 \times 20 = 256000$ rails, or twentieths of a rod in one side, 4 times which = 1024000 number of rails and acres in the field.

WIMMER, *Coschocton, O.*

2. [Vol. II, No. 11, Q. 8, p. 368.]

If an article had cost me $12\frac{1}{2}\%$ more, my rate of gain would have been 5% less. What was my rate of gain?

Ans. Let 100% = the cost.

5 per cent. = $12\frac{1}{2}\%$ per cent. of the cost at $12\frac{1}{2}\%$ per cent. more.

$\therefore 5\% + 12\frac{1}{2}\% = 40\%$ of the cost at $12\frac{1}{2}\%$ more.

$40\% + 5\% = 45\% =$ of the cost, or of 100%.

$100\% - 45\% = 55\%$ per cent. = rate of loss.

F. Gillum Cromer, in March number, gives solution thus: Let $112\frac{1}{2}$ per cent. = cost; on $12\frac{1}{2}\%$ per cent. of cost, gain 5 per cent., on 1 per cent., gain $\frac{1}{2}$ per cent., and on $112\frac{1}{2}\%$ per cent cost, gain 45 per cent.

45 per cent. is *not* the rate of gain, but 45 per cent. of the cost, and being 55 per cent. less than the cost, the rate of loss must be 55 per cent.

This question should read: If an article had cost me $12\frac{1}{2}\%$ per cent. more, my rate of loss would have been 5 per cent. more.

CORNELIUS DILLY.

3. [Vol. III, No. 2, Q. 7, p. 64.]

A flag-staff is 120 ft. high and $2\frac{1}{2}$ in. in circumference. How many feet of twine will it require to wind spirally around it from the bottom to the top, passing once around it in every 3 ft.?

Ans. The length of the line represents the hypotenuse of a triangle, of which 120 ft. is the perpendicular, and 40 times $2\frac{1}{2}$ in. the base.

$$14400 + 69\frac{1}{4} = 14469.4444 + ;$$

$$\sqrt{14469.4444} + = 120.28 + \text{ft. or } 120 \text{ ft. } 3\frac{1}{2} \text{ in., nearly length of twine.}$$

L. P. ROSE.

4. [Vol. III, No. 2, Q. 1, p. 63.]

A borrows a sum of money at 6 per cent., payable semi-annually, and lends it at 12 per cent., payable quarterly, and clears \$2450.85 a year. How much money does he borrow?

Ans. Suppose he borrows \$1; at the end of 6 mos. it amounts to \$1.0609, of which he pays 3 ct. for interest, leaving \$1.0309, which, in the next 6 mos. will amount to \$1.09368181, from which, on paying 3 ct. int., he will have remaining \$1.06368181, thus clearing in the year \$.06368181 on each one dollar (\$1) borrowed; \therefore he will have to borrow as many dollars as \$.06368181 is contained in \$2450.85, which is 38485.87 times, or \$38485.87.

M. E. EAGLETON.

5. [Vol. III, No. 2, Q. 1, p. 64.]

Who was Southey? Name some of his works.

Ans. Robert Southey was a distinguished English poet, born in Bristol, England, August, 1774. He wrote on a great variety of subjects, among which *Madoc*, *Thalaba*, *The Curse of Kehama*, *Roderick*, and *The Last of the Goths*, are the principal. In 1813 he was appointed "Poet Laureate," a post which he retained till his death in March, 1843.

G. L. R., *Adams, Ind.*

6. [Vol. III, No. 2, Q. 2, p. 64.]

What is the office of a "Poet Laureate?" Who is now "Poet Laureate?"

Ans. A Poet Laureate is an office of the King's household whose business it is to compose an ode annually for the King's birth day and other suitable occasions.

Alfred Tennyson is the present Poet Laureate.

D. W. BOWMAN, *New Madison, O.*

7. [Vol. III, No. 3, Q. 2, p. 107.]

Give the name of the present rulers of all the countries of Europe.

Ans. Austria-Hungary, Emperor Franz Joseph I.

Belgium, King Leopold II.

Denmark, King Christian IX.

France, President Jules Grevy.

Germany, Emperor Wilhelm I.

Great Britain and Ireland, Queen Victoria.

Greece, King Georgios I.

Italy, King Humbert I.

Netherlands, King William III.

Portugal, King Louis I.
 Russia, Emperor Alexander II.
 Spain, King Alfonso XII.
 Sweden and Norway, King Oscar II.
 Switzerland, President Col. B. Hammer.
 Turkey, Sultan Abdul-Hamid-Khan.
 Roumania, Prince Charles.
 Servia, Prince Milan.
 Montenegro, Prince Nikita.

W. C. SPALDING.

NOTES.

A CRITICISM.

[Vol. III, No. 1, Q. 4, p. 22.]

Two wheels, one 5 ft. in diameter, the other 8 ft. in diameter, are connected by an axle 6 ft. long, the axle turning with the wheels; how many revolutions will they make in describing a circle?

J. W. Jones in his solution of this problem supposes the wheels to be placed on the plane, upon which the circle is to be described, in such a position that the diameter of either wheel drawn to the plane will be perpendicular to the plane; at least this conclusion is warranted when he says, " $8-5=3$; $3:6::8:16$ ft.=radius of circle," since no other position of the wheels would give such a result. This is evidently wrong; for, since the wheels are of unequal radii, the axle inclines toward and if sufficiently produced would meet the plane. The distance from this point to the circumference of the larger wheel is equal to the radius of the outer circle; also, the hypotenuse of the right triangle whose base is the radius of the larger wheel and perpendicular the distance from its center to the point where the produced axle meets the plane.

Hence, $8+2=4$; $5+2=2\frac{1}{2}$; $4-2\frac{1}{2}=1\frac{1}{2}$; $1\frac{1}{2}:6::4:16$ ft.=perpendicular of right triangle. $\sqrt{4^2+16^2}=\sqrt{272}$ ft.=radius of outer circle. $\sqrt{272}+4=\sqrt{17}=4.12$ —revolutions, instead of 4 as given in THE TEACHER.

J. CHAS. STONE.

Editor Normal Teacher:

My only apology for this letter is, that an error in Mathematics is painful to me, and Mr. H. C. Rogers's solution of the "well and stone" problem on p. 107, No. 3, Vol. III, is so bad that I wonder it passed the eyes of your Mathematical editor. The sound would require over 3700 seconds to come from the bottom of a well as deep as his solution makes it. So that little fact knocks the bottom out of his solution, if not of his well.

Correct Solution: The distance passed over by a falling body in any number of seconds is equal to the square of the seconds multiplied by $16=(16t^2)$.

Let x =time (in seconds) required for the stone to fall.

Let $10-x$ =time required for the sound to ascend.

Then $16x^2 = 1090(10 - x)$

$$16x^2 + 1090x = 10900$$

$$x^2 + \frac{545}{8}x = \frac{2725}{2}$$

$$x^2 + \frac{545}{8}x + \left(\frac{545}{16}\right)^2 = \frac{471425}{64}$$

$$x + \frac{545}{16} = \pm \frac{217}{8}$$

$$x = 8.85 \text{ sec.}$$

$$10 - x = 1.15 \text{ sec.}$$

$1090 \times 1.15 = 1253.5$ —ft.—the depth of the well—, which is considerably less than 4194304 ft.

J. C. GREGG.

CRITICISMS ON ANSWERS.

F. W. Noyes's solution of question No. 8, Vol. II, No. 9, p. 281, is slightly wrong, as he computes brokerage on *the face* instead of on the *cost* as he should do. He should say $\$15000 \times 81.6$ per cent. = $\$12240$, and not $\$12300$.

W. R. Hammer's result in solution of Q. 12, Vol. II, No. 7, p. 204 is manifestly wrong. His solution is correct but he makes an error somewhere and gets 1.587+gills where he should get 16.0745+gills. *Can't we have the solutions and results correct?* *Id.*

EXAMINATION DEPARTMENT.

QUESTIONS PREPARED BY THE INDIANA STATE BOARD OF EDUCATION, FOR THE EXAMINATION OF TEACHERS IN APRIL, 1880.

WRITING.

1. Describe the construction of the letter d; that is, of what lines or principles is it made. 10.
2. What is taken as the standard of measurement in width and height for the same letters? 10.
3. What faults are pupils likely to fall into in writing the letter m? What in g? 2 pts., 5 each.
4. Write the last ten letters of the alphabet as capitals. 10.
5. Write all the letters that are just two spaces high. 10.

Let the penmanship of the candidate as shown in the answers to the above questions be marked from 1 to 50 according to the judgment of the Superintendent.

ORTHOGRAPHY.

1. Divide the following words into syllables so as to show the etymological composition of the word:—*advertise*; *philosophy*; *nevertheless*; *enslave*; *expunge*. 5 pts., 2 each.
2. (a) How many sounds may the letter *e* be used to represent? (b) Write a word illustrating each. 2 pts., 5 each.
3. Add the suffix *ed* to the following words and state why you do or do not double the final consonant:—*revel*; *perform*; *daub*; *acquit*; *plan*. 5 pts., 2 each.

4. What is the meaning of the following abbreviations?—1. *ck*; 2. *B. C.*; 3. *etc.*; 4. *hdkf.*; 5. *i. e.* 5 pts., 2 each.

5. What is a consonant? Use *y* as a vowel and as a consonant. 2 pts., 5 each.

6. Spell correctly the following words:—*perceive*; *cypher*; *residue*; *nickle*; *pickle*; *bridal*; *rebbel*; *pebble*; *cargos*; *tacit*. 10 pts., 5 each.

READING.

“‘Brother,’ said Christain, ‘What shall we do? The life that we now live is miserable! For my part I know not whether it is better to live thus or to die out of hand. My soul chooses strangling and death rather than life, and the grave is more easy for me than the dungeon.’”

—From *Pilgrim's Progress*.

1. Who was the author of *Pilgrim's Progress*? When and where did he live? 2 pts., 5 each.

2. Indicate the elementary sounds in the following words, using the proper diacritical marks:—*dungeon*; *brother*; *chooseth*; *miserably*; *Christain*. 5 pts., 2 each.

3. Are the marks of quotation and the other marks of punctuation properly used in this extract? If any changes should be made state your reasons for them.

4. Define the following words and phrases as used in the above extract:—*Christian*; *life*; *to die*; *out of hand*; *dungeon*; *Soul*. 5 pts., 2 each.

5. What purpose had the author in view in writing the *Pilgrim's Progress*? 10.

Let the candidate read a selection at sight, upon which he shall be marked according to the judgment of the Superintendent, from 1 to 50.

ARITHMETIC.

1. Define a factor, a proper fraction, a mixed number, and a compound fraction. 4 pts., 3 off for each om.

2. Divide the L. C. M. of figures 21, 48, 28, and 63 by the G. C. D. of 608, 544, and 416. L. C. M. 4; G. C. D. 4, and.

3. If \$29¾ buy 59½ yd. of cloth, how many yards will \$41¼ buy? By proportion. 3 st.; proc. 3; ans. 4.

4. Reduce 3600 grams to kilograms. Proc. 5; ans. 5.

5. Jerusalem is 30° 8' 3" east long. Washington City is 77° west long. When it is 4 P. M., Wednesday, at Jerusalem, what time is it at Washington City? Proc. 5; ans. 5.

6. (a) Name a unit used in measuring distance. (b) One used in measuring surfaces. (c) One used in measuring solids. a—3; b—3; c—4.

7. A note of \$250, dated June 5, 1874, was paid Feb. 14, 1875, with interest at 8 per cent. per annum. What amount was paid? Proc. 5; ans. 5.

8. What per cent. does stock yield which has been purchased at 90, and pays a dividend of 6 per cent. per annum? Proc. 5; ans. 5.

9. How many square feet in the surface of a cube whose volume is 94,7818,816 cubic feet? Proc. 5; ans. 5.

10. Define a parallelogram, a trapezoid, and diameter.

3 pts., 3 off for each om.

GRAMMAR.

The famous Charter Oak of Hartford, Conn., fell Aug. 21, 1856.

1. What is the logical subject of the above sentence? The grammatical predicate? 2 pts., 5 each.
2. Parse Aug. and 21. 2 pts., 5 each.
3. Name the proper nouns in the above sentence.
3 off for each error or omission.
4. What is the distinction between Parsing and Analysis? 10.
5. What is the distinction between relative and personal pronouns? 10.
6. Write a sentence containing an interrogative pronoun in the nominative case and a relative pronoun in the objective case. 2 pts., 5 each.
7. What is the difference between prepositions and conjunctions? How would you teach this? 2 pts., 5 each.
8. What moods and tenses have an interrogative form? 10.
9. Correct,—*Much depends on the pupil being taught how to study*, and give the reason for the change. First part 4; second part 6.
10. Write the plural of wharf, axis, focus, cherub, phenomenon. 5 pts., 2 each.

GEOGRAPHY.

1. What is Geography? In what respect does it differ from Geology? How is it divided? 5 pts., 2 each.
2. Name two advantages derived from rivers in level countries. 2 pts., 5 each.
3. What are the Trade Winds? What, the Counter Trade Winds? 2 pts., 5 each.
4. Locate Capes Lookout, Fear, Mendocino, Flattery, Horn. 5 pts., 2 each.
5. What three small bodies of water separate Europe from Asia Minor? In what country are the Sphinx and Pyramids? 4 pts., 2, 2, 2, 4.
6. What outlet has the Caspian Sea? What, the Great Salt Lake? Why are there no long rivers on the west side of South America? 3 pts., 3, 3, 4.
7. When it is summer at New York, what season is it at Rio Janeiro? Why? 2 pts., 4, 6.
8. Name two important rivers that flow into the North Sea. What three great empires are in Asia? 5 pts., 2 each.
9. Are the isothermal lines more northerly on the east or west coast of the Atlantic Ocean? Why? 2 pts., 3, 7.
10. Fill the following blanks. 10 pts., 1 each.

	Indiana.	Kentucky.	Missouri.	California.	Vermont.
Mineral Production					
Vegetable Production					

HISTORY.

1. What race of Europeans first discovered North America? 10.
2. How came the name *America* to be given to this continent? 10.
3. (a) Where in the United States was born the first child of English parents? (b) Her name? a—7; b—3.
4. Give a brief sketch of Pocahontas. 10.
5. By whom was the settlement of Maryland made? 10.
6. (a) Who was Marquette? and (b) what explorations did he make? a—4; b—6.
7. In what way was Georgia settled? 10.
8. Name three leading men in the first Continental Congress, 1774. 10.
9. What made the United States Constitution of 1789 a necessity? 10.
10. What occasioned the duel between Hamilton and Burr, 1805? 10.

NOTE.—Narratives and descriptions should not in any case exceed six lines.

PHYSIOLOGY.

1. How are the bones of the head divided? How many bones are there in each division? What is the advantage of the top of the head being arched? 3 pts., 3, 3, 4.
2. Describe a ball-and-socket joint. What is the advantage of this form of joint? 2 pts., 5 each.
3. What is the difference, in office, between flexor and extensor muscles? 10.
4. Name the four classes of teeth. Why should the teeth be thoroughly cleansed after eating? 2 pts., 5 each.
5. What is the action of the saliva upon food? Why should food be thoroughly chewed before taken into the stomach? 2 pts., 5 each.
6. What is the effect of the pulmonic circulation of the blood? 10.
7. What is the distinction between the sensory and motor fibres of nerves? 10.
8. What is the function of the pores of the skin? 10.
9. Why is pure air essential to health? 10.
10. What is the tympanum of the ear? What is its use? 2 pts., 5 each.

THEORY AND PRACTICE.

1. How far is the teacher responsible for the moral training of his pupils? 20.
2. What mental faculties are most active in childhood? 20.
3. What are the most common faults of teachers in giving oral instruction? 20.
4. What is your opinion of the practice of offering prizes as an incentive to study? 20.
5. How would you impart an idea of a mountain to a child who had never seen one? 20.

ANSWERS TO STATE BOARD QUESTIONS FOR APRIL,
1880.

IN SPECIAL CHARGE OF ANNIE M. SHERRILL.

The Number of the Answer Corresponds to the Number of the Question.

WRITING.

1. The small *d* is a modified *a*, being composed of the modified pointed oval, the straight line, and the extended hook. The modified pointed oval in the construction of *d* is continued upward on the regular slant one space and retraced back to the head line by the extended hook, which is the hook with its straight line made one space longer at the top.

2. A space in height is the height of the shortest letters. A space in width is the distance between the straight lines of the small *u*.

3. In making the letter *m* pupils are likely to fall into the fault of not separating the curves and straight lines at the bottom, of making the upper turns too broad or too narrow, of lack of uniformity of slant, &c.

ORTHOGRAPHY.

1. Ad-vert-ise; philo-sophy; never-the-less; en-slave; ex-punge.

2. Five. Regular Sounds: E, *long*, as in Eve; E, *short*, as in End. Occasional Sounds: E, like a, as in Ere. E, like long a, as in Eight. E, as in Ermine.

3. Reveled; performed; daubed; acquitted; planned. Rule: On receiving a suffix beginning with a vowel, the final consonant of a monosyllable, or of any word accented on the last syllable, is doubled, if the root ends with a single consonant preceded by a single vowel; otherwise it remains single.

4. 1. Church; Chapter; Charles; Charlotte; Chaldron. 2. Before Christ; Board of Control. 3. And others; and so forth. 4. Handkerchief. 5. That is.

5. A consonant is an articulate sound which in utterance is usually combined and sounded with an open sound called a vowel. Y has a vowel sound in *buy*; consonant sound in *young*. W and y are consonants when they precede a vowel sound in the same syllable and are vowels in all other places.—*Hart*.

6. Perceive; either cipher or cypher; residue; nickle; pickle; bridal; rebel; pebble; cargoes; tacit.

READING.

1. John Bunyan. In England, from 1628 to 1688.

3. No change required.

4. *Christian*, the name of a character. *Life*, state of existence in this world. *To die*, to cease to live. *Out of hand*, without hesitation or delay. *Dungeon*, the prison in which he wrote. *Soul*, the mind, the immortal part. His soul chose strangling for his body.

5. He wrote it more as a recreation than as a work of any importance. After it was finished, a long time elapsed before he made up his mind to publish it. He consulted his friends.

"Some said, 'John print it,' others said, 'not so.'

Some said, 'it might be good;' others said, 'no.'"

—*Sprague's Masterpieces in Eng. Literature.*

ARITHMETIC.

1. A factor of a number is a number that will divide it without a remainder. A proper fraction is one whose denominator is greater than its numerator. A mixed number is an integer and a fraction united. A compound fraction is a fraction of a fraction.

2. L. C. M. of 21, 48, 28, 63, is 1008. G. C. D. of 608, 544, 416, is 32. $1008 \div 32 = 31 \frac{1}{2}$.

3. (1) Statement: Take $59 \frac{1}{2}$ yd. for the 3d. term, because it is of the denomination required in the answer. Since the nature of the problem requires the answer to be greater than the 3d. term, take the greater remaining number, $\$41 \frac{1}{4}$, for the second term, and $\$29 \frac{3}{4}$ for the first. $\$29 \frac{3}{4} : \$41 \frac{1}{4} :: 59 \frac{1}{2} \text{ yd.} : (?)$.

$$1 \frac{1}{4} \times 2 \frac{3}{4} \times 1 \frac{1}{4} = 8 \frac{3}{4} = \text{no. yd.}$$

4. 1 kilogram = 1000 grams.

In 3600 grams, there are as many kilograms as 1000 is contained times in 3600, which are 3.6 times. Therefore, 3600 grams = 3.6 kilograms.

5. Dif. of long. = 107° , $8'$ $3''$ equivalent to 7 hr., 8 min., $32 \frac{1}{2}$ sec. of time. Washington being west of Jerusalem has therefore earlier time. 4 o'clock P. M. is the 16th hr. of the day. 7 hr., 8 min., $32 \frac{1}{2}$ sec. earlier in the day would be 51 min., $27 \frac{1}{2}$ sec. after 8 A. M.

6. The linear foot. The sq. ft. The cubic ft. The units of length, surface or solid measurement may be the inch, foot, yd., rd. or mile always in the first case linear in the second a square, in the third a cube.

7. Time from June 5, 1874, to Feb. 14, 1875, is 8 mon., 9 da.

$\$20.00 =$ Int. on $\$250$, at 8 per cent. for 1 yr.

$\$13.33 \frac{1}{3} =$ " " " " " $\frac{1}{3}$ yr.

.50 = " " " " " $\frac{1}{2}$ yr.

$\$13.83 \frac{1}{3} =$ " " " " " 8 mon., 9 da.

8. $\$100$ of the stock, at 6 per cent. yields $\$6$. $\$6$ is what per cent. of $\$90$?

$\$6$ is as many per cent. of $\$90$ as 1 per cent. of 90 is contained times in 6, which are $6 \frac{2}{3}$ times. Therefore, the stock yields $6 \frac{2}{3}$ per cent.

$$9. \sqrt[3]{94,818,816} = 455 +$$

$455 + 3 = 208125 +$. $208125 \times 6 = 1248750 + =$ no. sq. ft. in surface of the cube.

10. A parallelogram is a figure bounded by four sides, the opposite sides being equal and parallel. The trapezoid is a quadrilateral having two sides parallel. A diameter is any straight line drawn through the center and terminated each way by the surface.

GRAMMAR.

1. *The famous Charter Oak of Hartford, Conn.* is the logical subject. *Fell* is the grammatical predicate.
2. Supplying the words to the thought, *on the 21st day of Aug.*, 21, would be parsed as a numeral adj., limiting day, and Aug., as a noun in the obj. case, obj. of prep. of.
3. Charter Oak, Hartford, Conn., Aug. 21, and 1856.
4. The resolving of a sentence into its elements, or of any complex element into the parts which compose it, is called analysis. Parsing consists in naming a part of speech, giving its modifications, relation, agreement or dependence, and the rule for its construction.—*Greene*. The distinction attempted between analysis and parsing is by no means clear or well drawn. Nor indeed could it be because parsing is a species of analysis.—*Goold Brown*.
5. Personal pronouns always stand for the same grammatical person, there being a form for each person while the relative may stand for any grammatical person. Relative pronouns perform the office of connective, personal pronouns do not.
6. *Who* remembers the beggar *whom* we met on the highway?
7. Our connective words are of four kinds. These have a certain resemblance so far as they are all of them connectives. Conjunctions (except the introductory correspondents) join words or sentences together, showing their relation either to each other or to something else; conjunctions do not express any of the real objects of the understanding, whether things, qualities or actions, but rather the several modes of connection or contrast under which these objects are contemplated. The preposition expresses some relation of different things or thoughts to each other, and while prepositions naturally subject themselves to something going before, they assume the government of the terms which follow them and in this they differ from all other connectives.—*Goold Brown*. Pupils soon get an idea of the distinctive features of conjunctions and prepositions through their use and by parsing. They can be *taught* in no other way that we know of.
8. The indicative and potential moods in all their tenses.
9. We see no reason for changing the sentence as good authorities sanction the use of the objective, by *enallage*, for the possessive.
10. Wharves, axes, foci, cherubim, phenomena.

GEOGRAPHY.

1. Geography is properly a description of the earth's surface in its relations to man. Geology is a history of the formation of the crust of the earth as shown in the rocks and fossil remains. The divisions of Geography generally made are, Physical Geography and Political Geography, the former treating of the earth's surface in its natural state, the latter treating it as the territory of nations.
2. Rivers flowing through level countries and consequently having but little fall can not be used for manufacturing purposes, but when large afford

excellent and cheap means of transportation as well as furnishing water for the necessities of plants and animals.

3. Winds in the torrid zone and beyond, which blow from the same quarter throughout the year. North of the Equator they blow from N.-E. to S.-W., and south of the Equator they blow from S.-E. to N.-W. They are caused by the joint effect of the unequal heating of the surface of the earth and rotation. They are so called because of their advantage to navigation and hence to trade. The Counter Trade Winds are winds which blow constantly in an opposite direction to the Trade Winds. Between these and the Trade Winds there is a belt of calms. See *Maury's Physical Geography*.

4. Capes Lookout and Fear are on the east coast of North Carolina. Cape Mendocino is on the west coast of California. Cape Flattery on the northwest coast of Washington Territory. Cape Horn is on the south coast of South America.

5. The Straits of Dardanelles and Bosphorus and the Sea of Marmora. The Sphinx and Pyramids are in Egypt.

6. The Caspian Sea and the Great Salt Lake have no outlets. There are no long rivers on the west side of South America because the Andes mountains form the watershed of South America and the western slope is very short.

7. New York and Rio Janeiro being on opposite sides of the equator would have opposite seasons.

8. The Elbe and the Rhine. The Chinese Empire, the Empire of Japan and Indo-China.

9. The isothermal lines are more northerly on the east coast of the Atlantic because the warm waters of the Gulf Stream modify the climate.

10. Indiana.	Kentucky.	Missouri.	California.	Vermont.
Coal.	Coal.	Iron.	Gold.	Marble.
Corn.	Tobacco.	Corn.	Wheat.	Maple Sugar.

HISTORY.

1. It is supposed to have been discovered by the Northmen as the inhabitants of Norway and Sweden were called.

2. It was called America from Americus Vespucci, a Florentine who explored and mapped the eastern coast and published an account of his explorations.

3. The first child born of English parents in the U. S. was Virginia Dare. She was the granddaughter of John White who was appointed by Raleigh governor of the Roanoke Colony.

4. Pocahontas was the daughter of Powhatan an Indian chieftain. As the story goes Captain John Smith having been captured and brought bound before Powhatan was condemned to die, and as the chief raised his club to take his life Pocahontas rushed in and implored her father to save the life of Smith, which was done. This incident is pronounced a fiction by late historians. Pocahontas in 1613 married John Rolfe who took her

to England. She died at the age of 22, leaving a son from whom have descended some of the important families of Virginia.

5. Maryland was settled by English Catholics under Lord Baltimore.

6. Marquette was a Jesuit Missionary who in his zeal to spread the knowledge of the Catholic faith, explored Lakes Huron and Michigan and discovered the Missouri River, explored the Mississippi and part of the region which is now the State of Illinois.

7. Georgia was settled in 1733 by a company of English immigrants under Gen. James Oglethorpe. Many persons came from England to this settlement to escape imprisonment for debt in their own country.

8. John Adams, Benjamin Franklin and Patrick Henry.

9. The government under the Articles of Confederation was very defective. Congress had no power except that delegated by the States, there was no chief magistrate and no judicial arrangement. Questions grew out of the war which threatened to endanger the country unless some better system of government were adopted.

10. Burr desired the Presidency. Hamilton was a popular man and stood in his way. Burr resolved to kill him and sought a quarrel out of which grew a challenge to fight a duel.

PHYSIOLOGY.

1. Into the cranium, containing 8 bones and the face, containing 14 bones and the ear, containing 6 bones. The top of the head being arched gives great strength to the skull and tends to ward off blows.

2. A ball and socket joint that formed where the end of one bone is rounded or hemispherical and fits into a cup like cavity in the other bone. The advantage gained is from the fact that it permits motion in every direction.

3. The flexor muscles flex or bend the limb upon itself. The extensor muscles straighten or extend the limb.

4. Incisors, canines, bicusps, molars. The teeth should be thoroughly cleansed after eating to remove particles of food which, if allowed to remain, would ferment and injure the teeth.

5. The saliva moistens the food and assists in mastication and deglutition, also converts the starch into sugar. Food should be thoroughly chewed so that it will be readily mixed with the saliva and gastric juice.

6. The blood in circulating through the lungs becomes purified by being deprived of its carbonic oxide and receiving oxygen.

7. The sensory fibers of the nerves convey the influence which occasions sensation. The motor fibers convey the influence which occasions motion.

8. The pores of the skin are openings by means of which matters are excreted from the body. By excreting a great amount of water the temperature of the body is equalized.

9. Pure air is essential to health because the lungs demand as much oxygen as is contained in ordinary pure air, besides any other material

found in the air except oxygen and nitrogen, is more or less injurious if taken into the lungs.

10. The tympanum or middle ear is a small irregular cavity containing the membrani tympani which set in vibration by the waves of air produces in connection with the parts of the internal ear the sensation of sound.

THEORY AND PRACTICE.

1. The teacher should do all in his power to elevate the moral standard of his pupils.

2. The perceptive or observing faculties are most active in childhood.

3. Teachers are apt to talk too much; they are apt to use words and terms which children do not understand; they are very apt to tell what the children already know and which could be brought out by the class by judicious questioning.

4. It is not to be recommended.

5. It would be difficult to give a child an idea of a mountain unless he had seen one. You might tell him it was many times larger than a hill which you might refer him to.

COLLEGE DEPARTMENT.

DEVOTED TO THE INTERESTS OF THE CENTRAL NORMAL,
DANVILLE, INDIANA.

CONDUCTED BY G. DALLAS LIND.

DEAR FRIENDS:—Our prediction last month in regard to the attendance during the summer term has been amply fulfilled. Danville was literally taken by storm. Prof. Hopkins described the depot at Indianapolis as a sea of trunks all marked "61," and on inquiring what that meant was told that it meant *Danville*. Thus from all parts of Indiana and from almost every other state were pouring in ladies and gentlemen anxious to enroll with the band of earnest workers in the Central Normal. So many old students are back that we can't begin to mention names.

Many of those to whom these letters have formerly been directed are now here with us and our NORMAL TEACHER clerk has had extra work changing the addresses of subscribers from various points to Danville.

No other school in the U. S. can furnish apparatus for its students at the cost of the material. This is what is being done now in the Central Normal. As examples of what is being done here notice the following: Under the instruction of Dr. Tingley a number of the students have constructed magnets at a cost of only 25 cents which will lift many times their own weight and could not be bought anywhere for less than \$1.50. Another section are at work constructing compound and solar microscopes at a cost of \$3.00, which could not be bought anywhere for less than \$20.00.

These are only samples of the work which is being done. Almost any kind of philosophical apparatus can be constructed at the cost of the raw material and a little labor on the part of the students. No more than one hour a day is spent in the Laboratory and the practical knowledge obtained while engaged in constructing apparatus can not be estimated in dollars and cents. Students are enthusiastic over this feature of the Normal.

Mattie Boyd is teaching at Annapolis, Ill., and has a good school.

Rosalie Hamblen is teaching a ten weeks term at Pecksburg, Ind.

J. C. Stone has accepted the position of Principal of the Pittsboro, Ind., schools for next year.

L. T. Farabee is here now in the Normal. He will teach the Plainfield schools again next year.

The Aurora Literary Society gave a very interesting entertainment on the evening of May 13.

A boarding hall for the accommodation of the ever increasing size of the school is in contemplation.

The grounds around the College building have lately been greatly improved by a new fence and the planting of trees, shrubbery and flowers.

Prof. Steele is a genial, whole souled, active worker, is thoroughly at home in Normal harness and is rapidly making friends among students and citizens.

A reading room association has been organized and a room is now furnished with the leading dailies and weeklies of the country and with all the principal magazines and monthly journals.

Chas. Emmons will teach in the Intermediate Department of the North Salem schools next year. He is now in the Normal. Miss Mary Ballard will teach in the Primary Department in the same school.

J. C. Veatch, Jr., is at Eureka, Ind., engaged in the merchandise business and will be back next fall. He says, "Your school in the estimation of the people of this locality stands second to none in the State."

On May 6, 1880, Miss Effie Campbell, daughter of Hon. L. M. Campbell of Danville, and graduate of the Scientific Class of 1879, departed this single life and was united in the bonds of matrimony to Thad. S. Adams, one of Danville's rising young lawyers.

Luther Hawkins living near Danville, made the cabinet of the Central Normal a donation of a number of Indian relics and fine Geological specimens. He has the sincere thanks of Prof. Adams and all Normalites. Our cabinet now contains many valuable specimens illustrating every branch of Natural Science.

Prof. Marcus Sayler and Miss May Neiger concluded to embark on the voyage of life together, May 2, 1880. May she always think him a good "Sayler" and although the "Neiger" is no more, may the voyage on the stream of life be pleasant. Prof. Sayler has secured a position in the Rush Medical College, Chicago, for next year. It is a position, we understand which has never before been given to any person outside of that institution.

PUBLISHER'S DEPARTMENT.

RENEW! Have you? Don't fail to make a club for THE NORMAL TEACHER.

SHOW this number of THE NORMAL TEACHER to your friends and take their names.

WE have agents who are making, not only a living, but are actually laying up money selling our books. Go friend and do likewise.

IN sending stamps to this office, remember to send only in amounts of less than \$1.00 at a time and be sure that they are 1's and 2's.

S. L. MARROW & Co., Indianapolis, Ind., are offering agents the most liberal terms on their New Illustrated Indiana History, Historical Bibles, Voter's Text-Book and other standard works.

WE have received a large number of educational notes from County Superintendents in different states, many of which are very interesting and show that great progress is being made in the educational field everywhere. We should be glad to give space to all of these notices, reports, &c., but our crowded space will not permit.

EVERY reader should send for our new premium circular and make a club in his own locality. We offer a more valuable premium list than any school journal in America. We know whereof we speak. We defy competition in this line. Our premium list is the largest, and contains more valuable premiums for the money than any we have seen.

THE CENTRAL NORMAL COLLEGE is enjoying a remarkably prosperous session. Its many new features have attracted a large number of first class students. The work in all the departments was never better. The Review term which opens July 6, will be large. Those of our readers who have not yet investigated the merits of this school should do so *at once*.

VOL. I, No. 1, of a number of school periodicals have recently made their appearance upon our table. Among the number are the *Western Normal Educator*, published at Ladoga, Ind., and the *Western Educator*, published at Valparaiso, Ind. Both of these papers are organs of the schools located at these places and devote a good share of their space to the interests of the same. We bid them welcome and wish them much success.

While writing the above a new journal comes in which hails from Ft. Scott, Kan. Its name is the *Western Educational Review*. It don't say who is editor or whether it has any or not, but we rather judge it has from its make-up. May it live long and prosper.

WE are in receipt of the Normal Reader, by Prof. J. Vincent Coombs of the Ladoga Normal. It is a little work prepared expressly for use in that institution, but we do not see why it might not be used in other schools with as much success. It contains a short outline of the principles of Elocution and a number of valuable selections for practice.

THE many friends of Z. B. West and E. C. Kramer will be glad to learn of their success in the establishment of the Fairfield Normal School, at Fairfield, Ill. They ordered 50 Normal Question Books, 50 Methods of Teaching in Country Schools and 100 "Normal Teacher" Parsing Books for introduction into their classes. Send to them for circular.

WE again call attention to our advertising columns. If our readers will carefully read the advertisements every month they will learn who are responsible dealers and know just where to send for any book or apparatus that they may want. It will be greatly to our advantage and also the advertisers' if you will always mention THE NORMAL TEACHER in answering any advertisement.

APPLICATIONS for copies of THE NORMAL TEACHER are coming in at a lively rate from friends who wish to make up clubs among their fellow teachers at the Institutes; and it is gratifying to note the handsome lists that these specimen copies almost invariably produce. Teachers and others who wish to do lasting good cannot easily find a better way, at so little trouble, than that of placing THE NORMAL TEACHER in the hands of others.

GOOD NIGHT, GENTLE-FOLKS, is the title of a new quartette, by Will L. Thompson, author of the famous quartette "Come Where the Lilies Bloom." Concert and minstrel troupes pronounce it the most beautiful piece of music ever put on their programmes. It never fails to receive a hearty encore. The demand is such that it is scarcely possible to keep it in print. Music dealers write that they never knew a quartette to sell so fast. We advise lovers of music to send the price, and receive a copy by return mail. Published by W. L. Thompson & Co., East Liverpool, Ohio.

OUR books have had a grand sale this spring. We have had agents in every state and territory and the demand for them has taxed our printers to the utmost to fill the orders, owing to the difficulty in getting paper. But we shall now be able to more than supply the demand no matter what it may be as it is not now so difficult to secure paper as it has been during the spring. Thousands of our books will be sold at the Institutes during the summer and fall and right lucky will be the agent who orders a lot for his Institute. Send on your orders. They will be filled the day received.

WE are justly proud of the success of *THE NORMAL TEACHER*. Starting when it did in the midst of the "hard times" it has gradually increased its subscription list until now it can boast the largest circulation of any school journal in the United States. A large number of new subscriptions were received during April and something like a thousand or more in May. Clubs are now pouring in upon us at a rapid rate. Since *THE NORMAL TEACHER* was established a number of new journals have come and gone, and others witnessing our success have lately made their bow to the school teachers of the country. We wish them all success. There is a great work yet to be done in this country in waking up school officers, teachers and parents to the importance of the education of the youth of the country and we have nothing but good words for all co-workers.

A NUMBER of school journals that we could name have much to say about teachers not patronizing them. In the course of a year's reading the poor, overworked and penniless teacher gets many good clubbings for not subscribing for "some good educational paper." We notice that the best journals and those that merit patronage have a good circulation, and have least to say about patronage. For our part we are perfectly satisfied with the patronage accorded to *THE NORMAL TEACHER*. We have tried to make our journal practical and congratulate ourselves that we have been eminently successful. We have put it at such a low price that every teacher could afford to take it and teachers have been ready to give us their support. We wish in this connection to state a few points that every one of our readers should carry with him to his Institute:

1. *THE NORMAL TEACHER* has the largest circulation of any school journal in the U. S.
2. That it is pronounced by teachers and educators on both sides of the Atlantic to be the most practical school journal published.
3. That it gives more reading matter for the price than any other educational. Make a club at your Institute.

UNDER the head of "Agents Wanted," in *THE NORMAL TEACHER* of this month, will be found the important announcement of Flanagan & Clymer, of Buffalo, N. Y., concerning Cassell's Popular Educator, a complete Library of Knowledge.—Elementary, Advanced, and Technical Education. The latest revised edition, complete in six quarto volumes, bound in excellent style, makes a comprehensive encyclopædia, which is suited to every school and home library in America. As a work of reference, in all that pertains to History, Science, and Languages, we know of nothing more valuable. The admirable table of contents and general index shows that under various heads are included every branch of study that has a practical application to the affairs of life. The price of this great work is so low that every family can possess these comprehensive text-books, which will enable its members to educate themselves. Lessons are furnished and admirably illustrated in all the departments of science and art, in history, and in every known language, with facts and analytic methods of studying

each, that makes its name true to its useful mission,—The Popular Educator. For full particulars and terms for purchase or agency work, address Flanagan & Clymer, Buffalo, N. Y.

In the *North American Review* for May, ex-Judge Jere. S. Black continues the very interesting series of papers on the Third Term Question begun in the February number. His article is entitled "Gen. Grant and Strong Government," and its purpose is to show, first, that the limitation of tenure of office in the Presidency to two terms is a fundamental principle of our republican form of government; and, secondly, that not only does disregard of that principle threaten the permanency of republican institutions, but that Grant's third candidacy is actually a plot to revolutionize the republic and introduce monarchy. Mr. Leslie Stephen writes of "The Religion of all Sensible Men," and speculates on the prospect of that religion displacing the present creeds of the multitude. The creed of the future, he says, must be capable of assimilating modern scientific theories. George Ticknor Curtis continues his series of articles on "McClellan's Last Service to the Republic." These papers are specially valuable on account of the large number of hitherto unpublished documents which they contain. Mr. Francis H. Underwood contributes an essay on R. W. Emerson and his writings; and an anonymous writer labors to show that the United States Government cannot, consistently with the Monroe Doctrine, permit the construction of an American Isthmian canal, unless the same shall be controlled solely by cis-Atlantic Governments. The notices of new books are by Mr. Axel. Gustafson. The *Review* is sold by booksellers and newsdealers generally.

LAST summer we received a great many orders for books by telegraph. An agent would get to work in his Institute and find that he did not have half enough books to supply the demand. As the Institute lasted but five or six days and as one or two days had passed before the order was sent the books often failed to reach the agent until after the Institute had adjourned and all the teachers gone home. Then we were blamed because the books were not sent sooner. We desire to say *now* that only in a very few instances is it safe or best to order books by telegraph expecting to receive them by a certain train on a certain day. 1. The time is generally too short. 2. The distance is so great that a lightning express started the minute after the order is received could not reach the agent by the time he must have the books. 3. No allowance is made for any delays which often unavoidably occur. The better plan is to order as many books as you may think you can dispose of at your Institute, a week or more before hand, and all books left on hand unsold will be taken back less return express charges and the money refunded. This is an absolutely safe way. Another plan and by far the best one where an agent has the time is to canvass the county thoroughly two or three weeks before the Institute, taking orders by samples and then make his delivery at the Institute. We had many agents last year who made more money in this way during the

months of June, July and August than they made in six months teaching and did not work half so hard. Nearly all of our old agents are back with us this year, but we desire a host of new ones. If you think of accepting an agency please write us at once, stating choice of territory.

To GEO. P. ROWELL & Co's Newspaper Advertising Bureau, 10 Spruce St., New York, the press and the public are indebted for most of the statistics of American newspapers. When this firm commenced business in 1865, there was not accessible to the public, anything which approximated a complete newspaper list. It was the custom of the advertising agencies to keep their secret, believing that they thereby made it necessary for advertisers to consult them. In 1869, Messrs. Geo. P. Rowell & Co. issued the first American Newspaper Directory. In the preface of that work occurred this paragraph: "We have always believed, and labored in the belief, that, as Advertising Agents, it was and should be in our power to be of material service to both advertiser and publisher, and we know no better way to convince them of the value of our services than by issuing this book, thus enabling them to communicate without our aid; this we do in the belief that we shall thereby the sooner persuade them of the utility of employing and encouraging our agency." The result showed the position to be well taken. Within twelve months their firm was in receipt of a patronage larger than had ever before been accorded to an advertising agency. It is a fact, frequently commented upon, that there is no other business interest of the country, the statistics of which are so thoroughly set forth and made public, as that of making newspapers: and for this the American Newspaper Directory has the entire credit.

BOOK TABLE.

A MANUAL OF THE ANTIQUITY OF MAN. By J. P. MacLean. Cincinnati, Robert Clarke & Co. 8th edition. 159 pp. Price, \$1.00.

An excellent work and intensely interesting. When one takes it up for examination he does not feel like laying it down until he has read it through. It was the design of the author to produce a popular work, not so elaborate and expensive as the great works of Lubbock and Lyell, but presenting an outline of the subject for the information of those who have not access to the larger works or have not time to pursue their study. He has succeeded in this task most admirably.

MASTODON, MAMMOTH AND MAN. By J. P. MacLean. With Illustrations. 2nd Edition. 84 pp. Cincinnati, Robert Clarke & Co. Price, 60 cents.

The work consists of three parts. Part I contains an account of the Mastodon giving its history, general description, &c., with a description of the different species, distribution, &c. Part II discusses the Mammoth in a similar manner and Part III embraces what is known in regard to Man existing contemporary with these animals. The facts are presented in a plain and simple manner and by its perusal the reader will gain what other-

wise would require a search through many technical works which are beyond the reach of common readers.

THE MOUND BUILDERS, Being an Account of a Remarkable People which once Inhabited the Valleys of the Ohio and Mississippi; Together with an Investigation into the Archæology of Butler Co., Ohio. By J. P. MacLean. Cincinnati, Robert Clarke & Co. 233 pp.

This is a full, clear and interesting account of all that is known of the strange people who built the remarkable earthworks found in the Ohio and Mississippi Valleys. The following are some of the topics discussed: *Defensive Enclosures, Sacred Enclosures, Mounds, Works of Art, Mining, Advancement in the Sciences, Tablets, Frauds, Implements*. This book and the two noticed above place the author in a high rank as an Archæologist and Naturalist. The tendency of such works is to popularize Science, a much-to-be-hoped-for consummation. The masses of readers need to know more of such subjects. These books are neatly printed on tinted paper and finely illustrated.

THE CHEMISTRY OF COMMON LIFE, By the Late James F. W. Johnston, M. A., F. R. S. S., &c. A New Edition, Revised and Brought Down to the Present Time. By Arthur Herbert Church. New York, D. Appleton & Co. 591 pp.

A work coming from this firm scarcely needs recommendation. Prof. Johnston was one of the first who attempted to popularize the Science of Chemistry. For 25 years his book has been before the public and since its first issue a vast change has been made in the popular mind in regard to this subject. Then it was a locked mystery except to a few. To-day all educated persons, at least, know something of Chemistry. This book has had much to do in bringing about this result. The new edition has brought it up to the latest demands of the times and while lacking none of the essential features of the original work, it is in reality a new book, fresh and up to the latest developments of the science. To give a clearer idea of the contents we quote the headings of a few of the chapters: *The Air We Breathe, The Water We Drink, The Soil We Cultivate, The Plant We Rear, The Bread We Eat, The Beef We Cook, The Beverages We Infuse, The Sweets We Extract, The Liquors We Ferment, The Narcotics We Indulge in, The Odors We Enjoy, The Colors We Admire, The Body We Cherish*, &c. The teacher can not invest in a better book for his library.

THE CONSTITUTIONAL AND POLITICAL HISTORY OF THE UNITED STATES. By Dr. H. Von Holst, Professor at the University of Freiburg. Translated from the German by John J. Lalor and Alfred B. Mason. Chicago, Callaghan & Co.

Two large octavo, handsome volumes of 505 and 708 pp. respectively, bearing the general title given above, lie before us. The first has the additional title of 1750-1833. State Sovereignty and Slavery, the second 1828-1846 Jackson's Administration—Annexation of Texas. It has been said that none but an American can write the history of the United States. While it is true that a foreigner is apt to be prejudiced in favor of his own country and not having been born and reared among us can not have the spirit and sentiment of a true American and consequently is apt to be

biased in his views in regard to us and our peculiar institutions, it is also true that an American is apt to be prejudiced and the peculiar sentiment which is born and nurtured in him is apt to warp somewhat his mind from the exact truth. It is well at any rate that we look sometimes at ourselves through the eyes of another. We need to take an objective view of ourselves. Such a view would, at least, be interesting if not necessary. The present volumes and those which are to come from this author, will doubtless excite an interest among American readers equal to that of the works of De Tocqueville on Democracy in America. The work is strictly, as its title indicates, a constitutional and political history, discussing the theory of our government and republican principles in general. The author is an eminent German scholar who came to this country and entered wholly into the work of studying our institutions and as he says, "felt with the people of the United States before commencing to study them and their institutions." To the student of history, to the teacher, to the politician, and to every person who has an interest in our government, and this latter class should include all, we can earnestly recommend these volumes.

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THE NORMAL TEACHER.

VOL. III.

DANVILLE, IND., JULY, 1880.

No. 5.

V MATHEMATICAL GEOGRAPHY.—NO. VI.

ELIAS SCHNEIDER.

The earth not only moves through space in company with the sun, but it also revolves around the sun in an elliptic orbit whose mean diameter is about 93,000,000 of miles. It has therefore a compound motion; that is, the orbit or path in which the earth moves around the sun, is carried through space with the sun. This may be illustrated by the following supposition: Suppose a large vessel moves with any velocity upon a smooth surface of water in mid ocean. Now, suppose furthermore, that while the vessel is thus in motion, in any direction over such a smooth surface, a body is made to revolve around some point upon the deck of this vessel. This circular motion is not disturbed by the motion which carries forward the vessel and all upon it in its own direction. In like manner, the orbital motion of the earth in its elliptic curve around the sun, is not disturbed by the motion of the sun and solar system through space.

The curve in which the earth moves does, however, change. Indeed, change and motion are universal laws in nature. The orbit of the earth, astronomers tell us, is gradually changing from ellipticity to circular form. After having become a perfect circle it will change again to ellipticity ex-

panding and contracting in this manner at very long periods of interval, from one form to the other. But this change is not caused by the motion of the solar system through space; nor by any other motion of the earth's orbit of which astronomers tell us.

The question may now be asked if the earth was, at one time, a part of the sun, what connection is there between the period of the earth's revolution around the sun and the period of the sun's rotation upon its axis, when such separation occurred? There is indeed a law of planetary motion, controlling alike all the planets in their orbital motions. This law proves that there is a binding relation between them. The cubes of the mean distances of any two planets have the same ratio to each other as the squares of their periodic times. But what relation there is between the mean distances or periodic times of the planets and the rotation or mass of the sun now or at any former period has not yet been ascertained.

Still another motion of the earth is that of its rotation on its axis once in twenty-four hours, its surface moving from west to east. This motion is visible and cognizable to the eye by the apparent motion of the stars from east to west, causing them to appear to rise in the east and to set in the west, and giving also the sun and moon this apparent motion. On account of this motion of the earth all the stars rise in the east and set in the west when seen from the equator. But those at the north and south points of the horizon remain stationary and are always visible; those at a small distance describe a very small circle; those at a greater distance describe larger circles, and those at the equator describe great circles.

An observer, stationed at either astronomical pole, if this were possible, would see all the stars of one hemisphere continually; none either rising or setting, those in his zenith remaining stationary; those on the horizon moving unceasingly along the horizon, and those between the zenith and horizon describing circles of different sizes according to their

distances from the zenith, and all circles parallel to the circular horizon.

An observer, in our latitude, sees the north pole star at a distance above the horizon equal to the number of degrees of his north latitude. Therefore this star appears to him stationary, and all the other stars describe circles around it as a centre, these circles increasing in size as their distance from the pole star increases. When this distance of any star is sufficiently great such star will disappear a little while below the horizon, thus concealing from observation a small portion of its circular motion. The stars between the zenith point and the pole move from east to west; those between the horizon and the pole move from west to east. The stars in the southern hemisphere are hid entirely from our view to within a certain distance from the south pole; those of the northern hemisphere are to within the same distance from the north pole, never hid from our view. The former space is called the circle of perpetual occultation; the latter the circle of perpetual apparition.

The cause of the rotary motion of the earth, as well as of the other planets and sun, is still more difficult to account for than that of revolution around the sun. A very plausible theory has been advanced by eminent astronomers, but it is theory only and not an established fact. Those desiring information on this point will find it in our late works of astronomy.

Another motion of the earth is what astronomers call nutation. This consists of a small and slow movement of the astronomical pole, describing a gyratory circle, if I may so call it, and causing an apparent approach and recess of all the stars in the heavens to the pole in a period of 25,868 years. In consequence of this motion the bright star which we call the pole star at present, has not always been nor will it continue to be the pole star. In about 12,000 years it will be 12° or 15° from the pole. The cause of this motion is a "consequence of the rotation of the earth, combined

with its elliptical figure and the unusual attraction of the sun and moon on its polar and equatorial regions."

The last motion of the earth of which I wish to speak is the motion of the earth and moon around the center of gravity between these two bodies. The moon does not revolve around the earth nor the earth around the moon, but both revolve around their centre of gravity. This centre of gravity is between the centre of the earth and its surface, and it is this point which really describes the elliptic orbit around the sun.

CHEAP APPARATUS.

G. DALLAS LIND.

The time was when books were so scarce and consequently so dear that only the richest men could afford to own one. The Bible was kept chained in the churches just as a drinking cup is now sometimes kept chained to a pump or fountain in public places. Note the progress from that day to this. Now, the great works of the great authors can be had for a few cents. Books that formerly cost many dollars can now be had for the price of a few hours labor and yet authors and publishers make money. The secret of it all is that there is a great demand for books and reading matter generally. The demand has stimulated men to devise ways of supplying it. New inventions have of this necessity arisen and the supply can keep pace with the demand. The large sales compensate for small profits.

Many of us can remember when a wall map or globe or, in fact, any kind of apparatus except a birch rod, was as rare in a district school-house as log school-houses are to-day in the older parts of our country. We are sorry to say that many school-houses to-day have yet little or no apparatus, but great advances have been made in the last ten or fifteen years.

It is well known that great pains and labor were bestowed on the first books that were made. Days were spent by those who copied books in ornamenting and embellishing the initial letters of chapters. This work added to their cost. Many of the books printed in an early day were also elegantly bound and ornamented and, in fact, it is only within a quite recent period that books have been made in a cheap style to any great extent. Now the complete works of Shakespeare can be had for twenty-five cents and nearly all of the master pieces of the writers of present and past ages can be had for ten cents each. No one is excusable for not possessing at least some standard works.

The work of cheapening apparatus has begun also. The apparatus furnished for many of our high schools and colleges costs a small fortune it is true, but many teachers are learning to make their own apparatus and the demand for means of illustrating science has so increased that manufacturing firms are now putting up many pieces of apparatus at a comparatively low price. For example, globes can now be had for ten cents, not very durable nor very large, but yet answering all the purposes of a globe which can be used to illustrate the important principles in Geography. Globes which will serve the purpose can be obtained even cheaper than this, as one firm at least is now making paper collar boxes in the form of globes so that you can get a globe and ten collars for twenty-five cents.

Take away the paint and varnish and ornaments and some of the simply convenient arrangements of apparatus and there will be but little left which can not be made by the teacher or student at a very small expenditure of time and money.

The teacher's ability may be measured by his power of illustrating principles by means of apparatus. So far as possible he should make his pupils use the apparatus and if possible make them construct the apparatus. In some of our progressive Normal Schools the plan of encouraging pupils to construct their own apparatus now prevails.

Some of these schools now have a special department for this purpose, a manufacturing laboratory where under a competent instructor pupils can manufacture, not only the more simple forms of apparatus, but such apparatus as magnets, electrical machines, air pumps, compound and solar microscopes, telescopes and spectroscopes. Of course it is necessary to buy lenses and glass plates or mirrors which form parts of some of these pieces of apparatus, but they are put together and the greater part constructed entirely in the laboratory and the work is done by the students themselves. Thus for a few dollars, pieces of apparatus can be constructed which if bought would cost many times as much. The additional point is gained, that when a teacher who constructs such apparatus, knowing how it is made, can repair it when it gets out of order. There are many teachers who own air pumps but can not use them simply because having become out of order they did not know how to repair them. It should be a part of their education to learn how such machines are constructed as well as to know how to use them.

It has been said that a man who can not bore a hole with a saw or saw off a board with an auger should not study Chemistry. This is placing it in rather a strong light but there is much truth in it. The teacher of any branch needs this ingenuity or in other words, the power of adapting himself to circumstances. If a teacher can not prevail on school boards to provide appropriate apparatus he should be ingenious enough to construct something that will answer the ends.

Why should so much money be expended for apparatus elegantly finished and which only a few are able to purchase, when the same money might be spent in multiplying the same apparatus and thus bringing it within the reach of all.

Not only should teachers who expect to teach the Natural Sciences regularly in their schools be provided with means of illustration but all teachers need in connection with a

knowledge of these branches, means of illustrating them that they may be able to interest and instruct children in some of the more important general principles of these sciences. Such exercises are of vast importance in securing punctual attendance at school and in waking up minds otherwise dormant. We can not estimate the influence which such instruction will have on the future generation. The writer has a natural love for the branches of Natural Science and he can trace the origin of it to the fact that in his early youth certain books were thrown in his way, which attempted to simplify and illustrate the great principles of science. He also can trace a certain part to casual instruction given by some of his early teachers. We may without hesitation predict that the next generation will possess a much greater love for those sciences which treat of the common things around us and which lie at the foundation of our earthly wants and consequently the main causes of our earthly happiness.

SET it down as a fact, to which there are no exceptions, that we must labor for all we have, and that nothing is worth possessing or offering to others, which costs us nothing.—*Dr. Todd.*

THE true education, is to unfold and direct aright our whole nature. Its office is to call forth power of ever kind—power of thought, affection, will, and outward action; power to observe, to reason, to judge, to contrive; power to adopt good ends firmly, and to pursue them efficiently; power to govern ourselves, and to influence others; power to gain and to spread happiness. Reading is but an instrument; education is to teach its best use. The intellect was created not to receive passively a few words, dates, facts, but to be active for the acquisition of truth. Accordingly, education should labor to inspire a profound love of truth, and to teach the processes of investigation.—*Channing.*

TEXT-BOOK TEACHING.

R. W.

The United States is eminently the land of text-book teaching. Nowhere else does scholastic literature receive the attention it obtains here; nowhere is so much elegance displayed in the make-up, even of a primer. In the World's Exhibition at Vienna I noticed a set of American school books that formed the wonder and delight of the numerous continental publishers in attendance, and was afterward bought to serve as a model.

But in this perfection of book making a tendency shows itself to overestimate the educational value of text-books, and to underrate the independent and stimulating work of the true teacher. Superficial knowledge, both on the part of teacher and student, is fostered by an implicit reliance upon the manual. Its pages are conscientiously followed from the first to the last, and the main parts either committed to memory word for word, or else the set questions under the text are used—that curse of all true teaching. The system is certainly very convenient. “Stick” to your text-book and thereby avoid all real labor and the necessity of a thorough knowledge of the subject!

That such “teaching” must be barren of results, and, in many instances, even pernicious, every student of human nature will admit. The practice confuses the young heads, fills them with a vast mass of undigested material and produces the resemblance of knowledge when there is only a certain parrot-like ability to rattle off memorized phrases. Frequently, also, subjects that under the hands of a live teacher would call forth intense interest, become perfectly disgusting to the tortured head of the student.

But my protest against the abuse of text-books is by no means to be construed as a wish to banish them altogether, or in other words, to introduce the oral method exclusively.

Especially with advanced pupils a good manual is a necessity. To insure success, however, the teacher must be able, if need be, to instruct without any assistance from the book. His knowledge of the subject, his special home preparation for each lesson, his private reading, all these must enliven the matter found on the printed pages. He should, nay he must, be able to furnish additional information and to adapt his questions to the special needs of his school. Whenever possible, the topical mode of recitation is to be used, especially in history, geography and physiology. Of course these demands require much mental effort on the teacher's part. That class of teachers that insist upon introducing the particular text-book they always used and "cannot teach from any other," does not "fill the bill." Whoever shirks study and is unwilling to expend part of his wages on books and educational periodicals, is unfit to be an educator and the sooner he quits the profession the better for his pupils, or rather victims. If incompetent teachers who simply go for wages could be driven from our schools, the profession would soon rank among the highest. It is a misplaced charity to allow the blind in the position of leaders. They may be very nice people in their way, but they are out of place, and if they lack the power to perceive it, others must supply that deficiency. Every teacher is advancing his own best interests by carrying on a lively warfare against indolence, incompetency and rote teaching and I am glad to notice that **THE NORMAL TEACHER** is vigorously battling on the same common field.

BETTER the child cry than the father.

God helps them that help themselves.—*Franklin*.

THE word of the Lord abideth forever; His covenant is sure; His love is unchangeable; His promises are immutable. Draw nigh unto Him in the full assurance of faith, and your night of trouble will be turned into joyous day.

CORRESPONDENCE.

TEACHING NATURAL PHILOSOPHY.

Editor Normal Teacher:

The following outline prepared by J. L. Myers was selected from a number presented by my class at the close of a six weeks course in Natural Philosophy. I have made no changes except the omission of details. This I was obliged to do in order to bring it within the scope of an article for THE NORMAL TEACHER.

To those who maintain that nothing can be done in so short a time as six weeks in Philosophy, I have only to say that the members of this class, although they may not have all the definitions in the books at their tongue's end nor be able to explain and describe all the minute points of the subject, I am confident that they have a clear conception of the leading and fundamental principles of the science and have learned how to use a book in the investigation of the subject, or to sum up, they have laid a good, solid foundation and can now without the assistance of a teacher pursue the subject to any desirable extent.

It is not claimed that the outline is above criticism. I preferred to give it without change as better representing the work of the pupils.

I will state further, that this class prepared the apparatus and performed above forty experiments illustrating the more important points:

G. DALLAS LIND.

Existence.

1¹. Force, that which causes change in the form or condition of matter.

1². Kinds.

1³. Massic, taken as a mass.

1⁴. Gravitation, the tendency of all matter in the universe toward all other matter.

1⁵. Terrestrial, applied to the action of the earth's mass upon terrestrial bodies.

1⁶. Laws.

1⁷. The space described by a falling body in any given second, is equal to the product of the number of seconds into twice the space described the first second.

2⁷. The velocity acquired by a falling body at the end of any given second is equal to the product of the number of seconds into twice the space described the first second.

3⁷. The total space described by a falling body at the end of any given second is equal to the product of the square of the number of seconds into the space described the first second.

2⁶. Results.

1⁷. Weight, the measure of the force by which any given portion of matter gravitates to the center.

1⁸. Specific.

1⁹. Obtained by multiplying the specific gravity by the weight of the unit of water or air.

2⁹. Unit of comparison.

1¹⁰. Air, for gases and vapors.

2¹⁰. Water, for solids and liquids.

2. Absolute, the force which the earth's attraction exerts upon it and is expended in pressure against its support.

2⁷. Equilibrium, a state in which two or more forces balance each other.

1⁸. Stable, when a body will return to its original position after it has been displaced.

2⁸. Unstable, when a body tends to depart farther from its original position after it has been displaced.

3⁸. Neutral, where it remains at rest in any position after it has been displaced.

3⁷. Centrifugal force tends to make bodies fly farther from their center.

4⁷. Centripetal force tends to draw the the bodies toward the center.

2⁵. Universal, the attraction between distant bodies.1⁶. Laws.

1⁷. The times of vibration of any two pendulums are proportional to the square roots of their length.

2⁷. The lengths of any two pendulums are proportional to the squares of their times of vibration.

3⁷. The intensities of gravity at any two places are inversely proportional to the squares of the times of vibration of the same pendulum.

4⁷. The length of any two pendulums vibrating in the same time are directly proportional to their increments of gravity.

-
- 2⁴. Muscular, that which is produced by the strength of the muscles acting directly through machinery.
 - 1⁵. Elements of machinery.
 - 1⁶. Lever.
 - 2⁶. Wheel and axle.
 - 3⁶. Pulley.
 - 4⁶. Inclined plane.
 - 5⁶. Wedge.
 - 6⁶. Screw.
 - 2³. Molecular.
 - 1⁴. Cohesion is the force which causes like molecules to unite in one mass.
 - 1⁵. Estimated by the resistance which its particles offer to a strain tending to render them.
 - 2⁵. Applied.
 - 1⁶. By a direct thrust.
 - 2⁶. By a pull.
 - 3⁶. By a bending.
 - 4⁶. By a twisting.
 - 2⁴. Adhesion, the force which causes the molecules of the different kinds of matter to cling together.
 - 1⁵. Facts relating to the force of adhesion.
 - 1⁶. That it exists only between unlike molecules.
 - 2⁶. That it varies with the kind and state of matter.
 - 2⁵. Varieties.
 - 1⁶. Solids to solids.
 - 2⁶. Solids to liquids.
 - 3⁶. Liquids to solids.
 - 4⁶. Solids to gases.
 - 5⁶. Gases to solids.
 - 6⁶. Liquids to liquids.
 - 7⁶. Liquids to gases.
 - 8⁶. Gases to liquids.
 - 9⁶. Gases to gases.
 - 3⁴. Light.
 - 4⁴. Heat.
 - 5⁴. Electricity.
 - 6⁴. Magnetism.
 - 2¹. Matter.
 - 1². Properties.
 - 1³. Universal.
 - 1⁴. Extension.
 - 2⁴. Divisibility.
 - 3⁴. Indestructibility.

- 4⁴. Inertia.
- 5⁴. Impenetrability.
- 6⁴. Porosity.
- 7⁴. Compressibility.
- 8⁴. Expansibility.
- 9⁴. Mobility.
- 10⁴. Weight.
- 11⁴. Elasticity.
- 1³. Specific.
 - 1⁴. Elasticity.
 - 2⁴. Tenacity.
 - 3⁴. Hardness.
 - 4⁴. Brittleness.
 - 5⁴. Ductility.
 - 6⁴. Malleability.
- 2³. States.
 - 2³. Solid.
 - 3³. Liquid.
 - 4³. Gaseous.

CAUSE AND EFFECT.

Editor Normal Teacher:

Your correspondent, J. E. Baker attacks my method of working examples by cause and effect and vertical line cancellation. The vertical line is a matter of taste and convenience simply. It is as easy for the pupil to regard the figures on the right of the line as numerators or dividends and those on the left as denominators or divisors as the same relation on the horizontal line, Dr. Brooks to the contrary notwithstanding. If Mr. Baker will compare my method with Prof. Robinson's he will see that I do not follow Robinson, but improve upon him.

In some instances the relation between cause and effect is obscure it is true. But that matters not. In the example, "If a man walk 6 miles in 2 hours, how far will he walk in 5 hours?" the relation is not obscure, for 1 man and 2 hours time are the cause of a 6 mile walk, and 1 man and 5 hours are the cause of an X mile walk.

Worked thus:

$$\begin{array}{r|l}
 \text{E. X miles} & \left. \begin{array}{l} 1 \text{ man} \\ 5 \text{ hours} \end{array} \right\} \text{C.} \\
 \text{C. } \left\{ \begin{array}{l} 1 \text{ man} \\ 2 \text{ hours} \end{array} \right. & \left| \begin{array}{l} 6 \text{ miles E.} \end{array} \right. \\
 \hline
 & | 15 \text{ miles. Ans.}
 \end{array}$$

2 cancelling against 6 leaves on the right $3 \times 5 = 15$.

In the example "If 18d sterling equal 36 cts. U. S., what are 54d sterling worth?" it matters not whether we regard the pence or the cents as the cause or effect.

C. X cents	54 pence E.
E. 18 pence	36 cents C.

| 108 Ans.

By making X an effect and 54 the cause, &c., the result will be the same. So in the example "If 3 men do a piece of work in 8 days, in what time will 6 men do it?"

C. { X day	1 E.
6 men	8 day
E. 1	3 men } C.

| 4 Ans.

3 against 6 gives 2 and that against 8 gives 4 in "a jiffy," and merely changing the letters C and E does not change the result, only the reasoning; and in this case like causes are to each other as like effects, contrary to Dr. Brooks in his "funeral sermon."

Now to recur to Mr. Baker's example in proportion which has been printed and reprinted in your journal, I will for the second time give you my solution of it and leave the intelligent and candid reader to compare it with Mr. Baker's.

"If 12 oz. wool make $2\frac{1}{2}$ yds. cloth $1\frac{1}{2}$ yd. wide, how many lbs. will it take to make 150 yds. cloth $\frac{3}{4}$ yds. wide?"

C X lbs.	150	E
	$\frac{3}{4}$	
E { $2\frac{1}{2}$	11	lbs..C
$1\frac{1}{2}$		

	150
8	5
16	12
5	2
3	2

| $18\frac{3}{4}$ lbs. Ans.

Arranging the numbers below for cancellation across the line it requires less than 1 minute to work the example, and no mental strain.

South Union, Ky.

T. H. Rose.

"HE MADE THE WATER WINE."

Editor Normal Teacher:

Mr. Pugh in your January number analyzed the above sentence so as to make "water" the direct object of "made," and "wine" the attribute object of the same verb.

In your March number Mr. Warman criticises the analysis and adds, "It seems more clear that the wine was made, and that the water was used in making it."

It seems to me the construction depends on the obvious meaning of "made" here which in the connection is the same as "to change" or "to

convert." "He changed the water to wine," or "he converted water into wine," is what is meant. The word "made" cannot mean here the same as it does in the sentence "He made a mistake," or "He made a book." In analyzing sentences we must have regard to the obvious meaning of words, as many words are very flexible.

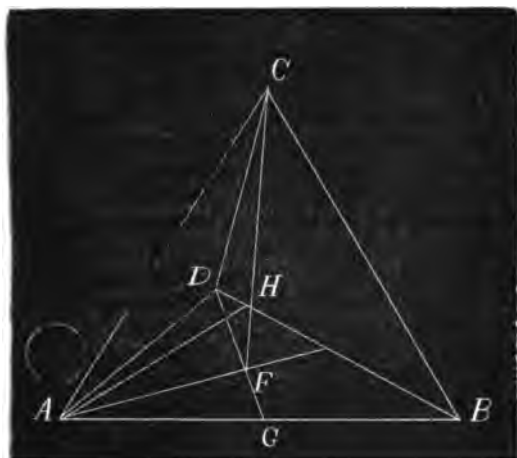
In this light I regard the analysis of Mr. P. correct.

T. H. R.

A FEW CRITICISMS.

Editor Normal Teacher:

In Mr. Gregg's solution of the ball question, there are several gross errors. He speaks of the "tetraedron]" and that each of its sides will be an equilateral triangle. This is false. The word *tetrahedron* he has erroneously spelled, which shows a lack of his knowledge of Greek. The word, Mr. Gregg, is *tetrahedron* and not *tetraedron*. There is also a difference between a tetrahedron and a regular tetrahedron, and should so be expressed.



In the figure $ABDC$, being a regular tetrahedron, all the edges are equal; that is, $AD=AB=DB=AC=DC=BC$. But Mr. G. says $AG=AD$, the half equal to the whole, which is a gross absurdity. Mathematical errors are painful to Mr. Gregg. The error is a greater one than H. C. Rogers's to the "well and stone" problem. It is evident that Mr. G's knowledge of mathematics does not extend beyond elementary algebra. He cannot appreciate my demonstration to the ball problem, because it contains principles in Geometry and Trigonometry.

Another example of Mr. G's ignorance of higher mathematics is shown in his solution of Mr. Schneider's problem. Mr. Schneider's solution does not destroy the "beauty of the equations by his complicated solution," but it shows that Mr. S. knows, and that Mr. G. does not know, what he is talking about.

The old formulæ, given by all algebraists for the solution of such examples, are the ones Mr. G. takes. All primary students of Algebra know this mechanical process. It is all right to use it in the recitation room, but it will not do to set up against *reason*.

Mr. G., read the article on Algebra in the *Encyclopædia Britannica*, and let the readers of *THE NORMAL TEACHER* know what you think of it.

Mr. Gregg, I want to give you a little advice; I trust you will heed it. Omit to your solutions and examples all impertinent remarks.

The following and similar expressions can be omitted without doing injustice to your solutions: "It can be done." "Don't say impossible, for it is not." "See?" "Here goes," and the like. By persisting in the use of such expressions, you will make yourself obnoxious to the readers of this journal. Lay aside your vanity. Do not be so dogmatical. Be more liberal. Be generous.

F. W. REUBELT.

As to what the teacher should be, constitutionally, we may say, it is eminently desirable that he should be well organized in every respect, both bodily and mentally. He should have an energetic, enduring, and elastic constitution, which can work easily and work long, and maintain its strength and activity. A person who is constituted like a slack-twisted string, like soft and porous wood, or like mellow metal that is easily impressed, and who has a character corresponding to such constitutional qualities, has no proper place in the school-room as a teacher. He should become the characteristics of the fiddle-string for toughness and density, of the steel spring in elasticity and of oak and hickory for sturdiness and endurance.—*Nelson Sizer*.

FREEDOM IN TEACHING.—Speaking on this theme, and having observed that the teacher who has to pull himself through the lesson will scarcely be able to pull anybody else with him, the *Sunday-School Times* proceeds:

"A thorough understanding of the lesson to be taught of course lies at the foundation of this freedom in teaching. One cannot give a very clear description of that which is to him as vague as 'men who look like trees walking.' Whatever the subject may be, this thorough understanding can be obtained only by patient study. No matter how long a teacher has been teaching a particular subject, when he comes to carry a new class through it, he needs to refresh his own mind upon it before going into class. When Arnold, who followed this rule, was asked why he took such pains, when these lessons had been prepared and taught so thoroughly in former days, he replied, 'I wish my pupils to drink from a running stream, and not from stale waters.' The teacher who acts upon such principles cannot fail to have freedom in his class."

NOTES AND QUERIES.

MATHEMATICS.

1. A cone whose specific gravity is .125, floats on water with its apex downward; how much of the axis is under water? Reverse the position of the cone and what will be the result? THOS. EUBANK.
2. What rate of interest is paid when a note due in 30 days is discounted in bank at 6%? E. M., *New Bremen, O.*
3. If my retail gain is $33\frac{1}{3}\%$, and I sell at wholesale for 10% less than at retail, what is my gain % at wholesale? FENTON MILLER.
4. Given $\sqrt{x} - \sqrt[3]{x} = 4$ to find x . J. A. P.
5. If my horse had cost 25% less than 80% of what it did cost, I would have gained in its sale a sum equal to $66\frac{2}{3}\%$ more than I did gain. What % did I gain? R. W., *Cypress Mill, Tex.*

GRAMMAR.

1. Analyze and parse italicized words:
Love thy neighbor *as thyself*. B. HARDING, *Rei, Ind.*
2. I must be *cruel only to be kind*. WM. P. SHAMHART, *Quaker City, O.*
3. *There is no joy but calm*. Id.

GEOGRAPHY.

1. Name the States of Mexico. J. W. DINGLEDINE, *Ohio.*
2. What volcano is farthest from the sea coast? J. C. ALEXANDER, SR.

ANSWERS.

1. [Vol. III, No. 3, Q. 6, p. 106.]

Is excellence in Mathematics usually considered a test of general mental power and capacity?

Ans. By many, excellence in mathematics is regarded as an index of general mental power, and an examiner once told us, teachers "good" in Mathematics were apt to be well versed in other studies. But we are of opinion that such excellence is *not* to be regarded a test of general mental ability. The powers of the mind seem in this respect strikingly unequal. The majority of those who study Mathematics require the aid of long-continued instruction to enable them to perceive numerical relations, and with it all many do not attain even to a mediocre proficiency; while others possess a power, even in uninstructed childhood, to which the ablest mathematicians despair to attain. George Combe, whose writings on Phrenology deservedly place him in the foremost rank of such reasoners, hammered away at that immortal invention of Pythagoras—the multiplication table—for forty years or more but never learned it. Uriah Parke tells us in his preface to "The Philosophy of Arithmetic" that he received assistance of Dr. Mendenhall; "A gentleman," says Parke, "intimately acquainted with the Science of Mathematics and who has asked no living teacher for in-

struction in that branch of knowledge." Cap, the Alabama slave, who (about 1844) so astonished the "natives," was a most remarkable illustration of mental imbecility combined with a high degree of power in respect to numbers. His was a mind but one remove from downright idiocy and this fact proves that if the elementary combination of numbers required the aid of the reasoning power, Cap's case could not be accounted for. In general, Mathematical excellence implies shrewdness in its possessor, but not necessarily great mental power. Those who devote much attention to the study are apt to become very fond of it, and may attain to remarkable skill in the management of numbers while their general knowledge may fall far short of their mathematical.

MIGNONETTE.

2. [Vol. III, No. 2, Q. 4, p. 63.]

Required the longest inflexible rod that can be thrust up a chimney, the arch being 4 ft. high and 2 ft. from the arch to the back of the chimney. (The back of the chimney to be straight).

Ans. Any point of the rod describes the curve of an ellipse as it moves up the chimney between two fixed planes at right angles to each other; hence we have $4^2 \times 2 = 32$; $\sqrt[3]{32} = 3.1748$ ft. Also $2^2 \times 4 = 16$; $\sqrt[3]{16} = 2.5198$ ft.; $\sqrt[3]{3.1748^3 + 2.5198^3} = 8.3238$ feet = length of rod.

J. W. JONES.

3. [Vol. III, No. 3, Q. 3, p. 107.]

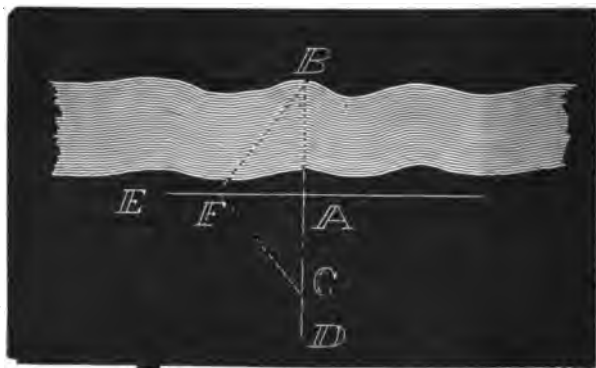
What animals existed in the Tertiary Period?

Ans. Among the invertebrates, great numbers of infusoria, corals, star-fishes, mollusks, crustacea, insects, &c.; among the vertebrates, several hundred species of fishes of which the Shark family, having immense teeth, is the most conspicuous; turtles of great size, crocodiles and sea-serpents; mammals of wonderful size and curious form, such as the Palæotherium, Zeuglodon, Dinotherium, Mastodon, Sivatherium and Elephas primigenius.

M. A. GRUBER.

4. [Vol. III, No. 2, Q. 5, p. 64.]

In the course of a march a General comes to a river which it is necessary he should cross. He has no boats and no appliances to make a correct measurement. How shall he cut timber of an exact length to reach across, taking his measurements on the one side only?



Ans. Let A be the point where he approaches the river, and from this place let him sight a line to a point B on the opposite bank and produce it back toward D. Let him also establish a line A E at right angles to this, and at some point F of the line measure the angle A F B; then at an equal angle sight the point C on the line A D. The distance from A to C is equal to the distance from A to B, and the width of the stream may be determined by measuring from the point A to its bank and subtracting this distance from the distance A C.

T. BAGOT.

Another Solution:

Let *cd* be the river bank; the general steps from *c* to *b*, 20 steps; then he sights a point *e* through the point *c*; then he steps 12 steps to *a*; at *a* he sights at the point *e*; then he returns to *c* and steps 10 steps to *d* in the line *ae*; then he multiplies 20 by 10, and divides the product by $12-10$: $-20 \times 10 = 200 \div (12-10) = 100$; the number of steps from *c* to *e*, or the distance across the river.

J. H. GANS.

5. [Vol. III, No. 4, Q. 4, p. 149].

A flag staff is broken in a storm 10 ft. from the ground. When the top strikes the ground the upper portion is again broken at such a point that the top piece is as long as the stump plus $\frac{3}{8}$ of the middle piece, and the middle piece is as long as the other two. How long was the staff before the storm?

Ans. The bottom piece is 10 ft.The top piece is 10 ft. + $\frac{3}{8}$ of the middle piece.The bottom and top are 20 ft. + $\frac{3}{8}$ of the middle piece.Therefore 20 ft. + $\frac{3}{8}$ of middle = the middle piece. $\frac{5}{8}$ of the middle piece = 20 ft. $\frac{1}{8}$ " " " = 4 ft. $\frac{3}{8}$ or " " = 32 ft.10 ft. + $\frac{3}{8}$ of middle = 22 ft. = top.

10 + 22 + 32 = 64 ft. the height before the storm.

W. R. HAMMER.

6. [Vol. III, No. 4, Q. 5, p. 149.]

A can do a piece of work in 40 days, B in 60 days. After both work 3 days, A leaves. When must he return that the work may occupy but 30 days?

Ans. A does $\frac{1}{40}$ of the work in 1 day, and B does $\frac{1}{60}$ of the work in 1 day. A does $\frac{3}{40}$ of the work in 3 days and B does $\frac{1}{20}$ of the work in 3 days; $\frac{3}{40} + \frac{1}{20} = \frac{1}{10}$ the part remaining for A to do when he returns which he will do in $\frac{1}{10} \div \frac{1}{40} = 4$ days. $30 - 17 = 13$. He must return at the end of the 13th day.

Id.



7. [Vol. III, No. 2, Q. 8, p. 64.]

Where shall a board, 12 ft. in length, 4 inches at one end and 12 inches at the other be cut in order that each end will contain the same area?

Ans. By problem 5, $12 \times 4 = 48 + (12 - 4) = 6$ feet, the distance from f to g . Now, there are 8 feet in the board, and there is 1 foot in the extension, $fe g$. Then by proportion, 9 ft. : 5 ft. :: $(18)^2$: $(x)^2$

$18 \times 18 = 324 \times 5 = 1620 + 9 = 180$; $\sqrt{180} = 13.41 = cg$; $18 - 13.41 = 4.59 = bc$, and $12 - 4.59 = 7.41 = cf$. The areas of similar triangles are proportional to their like sides.

A second method is to square each end, divide by 2 and take square root. $12 \text{ in.} = 1 \text{ ft.}$, $4 \text{ in.} = \frac{1}{3} \text{ ft.}$ $1 + \frac{1}{9} = \frac{10}{9}$; $\frac{10}{9} + 2 = \frac{28}{9}$; $\Rightarrow \sqrt{\frac{28}{9}} = 1.745 = cd$. Now, $1.745 + 2$, and divided into 4 feet, the area of $\frac{1}{2}$ of the board = 4.59 — same as above.

J. H. GRANS.

8. [Vol. II, No. 10, Q. 2, p. 327.]

What is the side of that cube which contains as many solid units as there are linear units in the diagonal through its opposite corners?

Ans. Let x = the side of the cube; then $x^2 + x^2 = 2x^2$ = the square of the diagonal of the side; and $x^3 + 2x^2 = 3x^2$. $\sqrt{3x^2}$ = linear units in the diagonal through the opposite corners of the cube, and x^3 = solid units of cube.

$$\therefore x^3 = \sqrt{3x^2}.$$

$$\text{or } x^3 = x\sqrt{3}.$$

$$\text{and } x^2 = \sqrt{3}.$$

$$\therefore x = \sqrt[4]{3} = 1.31607, \text{ side of the cube.}$$

CORNELIUS DILLY.

NOTES.

SHORTER ANALYSIS.

Editor Normal Teacher:

The communication of Mr. J. E. Baker in Vol. III, No. 3, p. 100, on the above subject is timely and sensible. The method has been used in the best schools of Germany for a long time and I should not have said any-

thing about it but for an improvement in the statement which I observed there. The written statement always occupies two lines; hence the German name "Zwei Satz," Rule of Two. The quantity sought for is placed in the end of the second line, immediately below the base term; the other terms come in couples, similar denominations always occupying the same place in their respective lines. Thus the statement of the example on p. 100 would be as follows:

Yards.	Width.	Oz.
2½	1½	12
150	¾	

R. W.

EDITORIAL NOTES.

THERE is no feature of the Normal School more marked than the practice of learning things by handling them. It is said that Pestalozzi with all his wisdom made grave errors in his system and that "object lessons" as presented by him, consisted in holding some object up before his pupils and having them repeat three times, "this is gypsum," or "this is chalk," as the case might be, the object was then put aside, under the supposition that those pupils knew gypsum or chalk. "A nail, a young sparrow and its beating heart in my hand, a fish taken out of the net and touched—*taken hold of* at any price, with all ten fingers, with twenty, provided we had that number; that was magnetism; it gave a clear conception." Says a learned writer on this theme, "It is a principle in the instruction of youth, in universal instruction, also in every activity of the educator that every thing which is to be actively and impressively felt, known and wished, must have certain events and experiences, and an immediateness for its foundation. What does the Normal School mean by claiming that it can do more for a young man or woman in a given branch in a given time than other schools based on the old system of getting perceptions at second and third hand? It means simply this, that at these schools your instructor will take you to the rocks to study Geology and show you how to use your text-books simply as an auxiliary, will teach you to study the structure of the earth so that wherever you may be you may learn the character of the formation upon which you stand and by reference to the books learn its name and the names of the rocks that compose it. He will teach you the Latin Grammar by having you read Latin. The rules of Arithmetic you will learn through processes of solution. The rules of English Grammar through their immediate application to cases in hand. Everything, as we said is learned through the use of it, and but few pupils require a very great while to catch this idea and master it sufficiently to carry it into their own schools.

The patronage accorded our independent Normal Schools is exciting some remark on the part of College papers in different quarters, and without any examination or test of the matter, they attempt to condemn as delusive and impossible the pretensions of the former. The *test* of school methods must be success in after life. Compare any number of normally trained students with an equal number from Colleges and the result will sustain fully all that is claimed for these schools. To a great extent they are attended by teachers, and those intending to teach. These come with an earnestness and purpose born of self-dependence. No rules or 'government' are necessary for such more than other respectable members of society require. Other young people come who are "sent off to school" by their parents and they have come to "try the Normal a while." Such as these, unformed in mind and character, coming find disorder and bad behavior entirely unfashionable among the students, and they soon fall in with the general atmosphere of diligence and love of learning, forming good habits and manifesting only good traits. We have seen this tested with the best of results. The very atmosphere appeals to the better nature—the manhood and womanhood of the pupils to develop itself, under such a system. Unmanliness and unwomanliness are so unpopular that a trespass brings its own sufficient sting. The shameful 'practical jokes' and 'smart Aleck' performances which checker the daily life of schools governed otherwise than through the sympathy and personal influence of instructors, *guiding into habits of right*, are not known where this system prevails. To be compelled to act as police and to be a standing committee of investigation of the petty offenses which school *rules* beget, is deleterious in the extreme to the higher influence which teachers might wield and *should* employ in the management of their pupils. School teaching is no system of machinery. Nothing requires more wisdom, more devices, more watchfulness to make of it the high calling which it should be. It is so easy to degenerate into mere "school keeping."

It is the policy of our Colleges to pass, in the educational stir of the time, as simply "conservative"—as resting in the dignity of perfection and proud repose. To us it seems they are rather the crystallized embodiment of much error and irrationality. No life, no growth there. Better be *fungus* than inorganic. But it is conceded in these days that a development of powers constitutes education, and surely the school which awakens one, shows him his powers, teaches him how to use them and puts him in the way of managing himself or developing himself is more truly an educational institution than that which simply uses the student's mind as a store house in which to pack ideas like wares. So that we think the Normal School may *rightfully* claim that it does more for the student in less time than Colleges do.

WHY are the Summer Institutes held by the County Superintendents in many places a good thing and why should the teachers attend them? Because it affords the Superintendent an opportunity to form an estimate o

the general and special abilities of the candidates for favors under his disposal, enabling him better to adapt the work to the worker. The teachers may, on their part learn something of the hopes and purposes of the Superintendent in his plans for the improvement of the schools of the county, and being thus in sympathy and understanding each other, surely a more vigorous and harmonious work should result. The Summer Institute affords not only an excellent opportunity for cultivating this mutual and necessary acquaintance, but of improvement in the branches and in the theory and practice of teaching. The Trustee, on his part, represents the interests of his township. He is a middle man, having in charge the moneys and the employment of teachers in his precinct. Of course it is his duty to see that the most be received for this money. In the endeavor to carry this into effect, some trustees adopt a very narrow policy. To secure the most for the least money is by no means accomplished by hiring the man who will teach for the least money, but rather by the Trustee's keeping abreast of the times, acquainting himself with the needs of his township and with the state of the educational market. That is, he should be a well informed man, and be interested enough to become still more so. The demand and supply of teachers works as follows: poor pay thins the ranks because men of strength cannot spend their energies for a pittance, and good pay while it offers encouragement to strong hands, lures in, likewise, the moth. Some sifting must be brought into requisition. Able teachers must be employed, and these should be paid. While the Superintendent holds in his hand the granting or withholding of license to teach in his County, trustees hold the power to grant or withhold such remuneration as will induce the best ability to enter the lists. It is desirable that something should be done which will retain the "big fish" and let the poor ones go. We know of no expedient which at present may be made more conducive to this end and other desirable ends than the County Institutes of from four to six weeks duration, conducted by the Superintendent. We can conceive of how it may be made a mutual protection and aid society. And we think that trustees as well as teachers should attend. They have as good reason to spend their remuneration money in self-improvement and for the good of the general cause as teachers have, and in order that all concerned in the educational interests of the County may constitute an harmonious and organized force.

THERE iz lots ov people in this world who are like a guide-board at the forks ov the road. They kan point out the way for others to persew; but they don't follow it themselves.—*Josh Billings*.

DUTY and OUGHT are the great words of morality. They have exactly the same meaning. Duty is that which is due. The *ought* is that which is *owed*. Indeed the word "ought" is but an obsolete form of the word "owed."—*Chadwick*.

GRAMMAR DEPARTMENT.

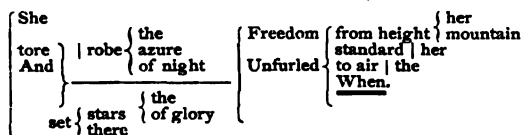
DIAGRAMS AND PARSINGS.

BY F. P. ADAMS.

We propose in this article to answer a number of questions which have been asked from various quarters.

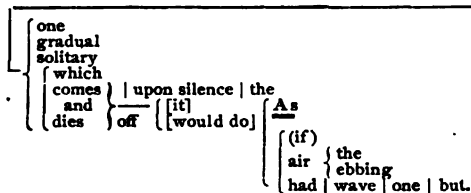
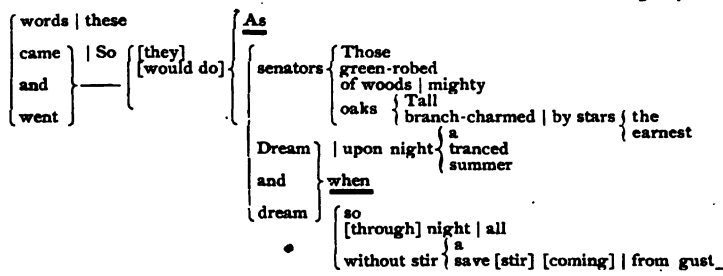
When Freedom from her mountain height,
Unfurled her standard to the air,
She tore the azure robe of night
And set the stars of glory there.

—*Harvey's Grammar, p. 170. Drake.*

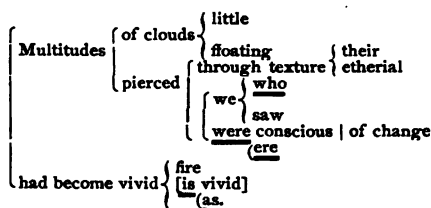


As when upon a tranced summer night
Those green-robed senators of mighty woods,
Tall oaks, branch-charmed by the earnest stars
Dream and so dream all night without a stir,
Save from one gradual solitary gust,
Which comes upon the silence, and dies off,
As if the ebbing air had but one wave;
So came these words, and went.

—*Keats. Har. Gram. p. 170.*



Multitudes of little floating clouds,
 Ere we, who saw, of change were conscious, pierced
 Through their etherial texture had become
 Vivid as fire.



(a) *He* that hath eyes to see, let (b) *him* (c) *see*.

(a) *He*, pron., pers., simp., ant. name of person spoken of, with which it agrees in 3d, sing., mas.; nom., absolute by pleonasm.

(b) *Him*, pron., etc., obj., subj. of the infinitive [*to see*]. Rule: The subject of an infinitive unless the same as the subject of a finite verb on which the infinitive depends, is in the *objective case*.

Remark: From the correspondence in THE TEACHER and other journals, and from the frequent answers given, it is evident that a large number of teachers do not understand this important principle. *Him* is not the object of *let*, either directly or indirectly. It is the subject of [*to see*].

In the sentence, "they made him hush," is *him* the object of *made*? He ordered the horse to be saddled. Is *horse* the object of *ordered*? We contend that in each case mentioned the word is *objective*, subject of the infinitive.

(c) [*To see*] *see* is an infinitive, with construction of a noun, the object of *let*. Rule: Infinitives and participles have the constructions of nouns, adjectives and adverbs.

I am now *at liberty to confess* that much which I heard objected to my late friend's writings was well founded.

At liberty is the attribute of this sentence, the phrase has the relation of an adjective and limits the subject. *At* shows the relation of the subject I to its object *liberty*.

To confess has the construction of an adjective limiting the noun *liberty*.

Which is objective case, subjective of the infinitive [*to be*] *objected*.

EXAMPLE and practice are more efficient than precept and theory.

WHAT is the use of health, or of life, if not to do some work therewith?
 —*Carlyle*.

EDUCATION is not creative; it only assists in developing existing possibilities into realities.—*Brooks*.

EXAMINATION DEPARTMENT.

QUESTIONS PREPARED BY THE INDIANA STATE BOARD
OF EDUCATION, FOR THE EXAMINATION OF
TEACHERS IN MAY, 1880.

WRITING.

1. How many spaces high is the loop in the small letter h? How many kinds of curves in the same letter? 2 pts., 5 each.
2. What is made the standard of measurement in width? What in height? 2 pts., 5 each.
3. Write ten letters, no one of which is properly more than one space in height! 10.
4. What good will it do a pupil to have him trace the copy carefully with a dry pen? 10.
5. Write the first five letters of the alphabet as capitals. 10.

Let the penmanship of the candidate as shown in the answers to the above questions be marked from 1 to 50 according to the judgment of the Superintendent.

ORTHOGRAPHY.

1. (a) What is the distinction between a *subvocal* and an *aspirate*? (b) Give two subvocals and two aspirates. a=5; b=5.
2. (a) What sound has the letter *i*? (b) Give words illustrating its different sounds. a=5; b=5.
3. Syllabicate and mark the accent of *superintendent* and *especially*. 2 pts., 5 each.
4. What rule of spelling is illustrated in spelling the plural of *chimney*? 10.
5. Write, with the proper marking to indicate the sound of each letter, the words *knowledge* and *science*. 2 pts., 5 each.
6. Spell ten words pronounced by the Superintendent. 5 pts., 2 each.

READING.

"Is it not better at an early hour
In its calm cell to rest the weary head,
While birds are singing, and while blooms the bower,
Than sit the fire out, and go starved to bed?"

—Lander.

1. Is the above extract a paragraph, or a stanza? Why? 2 pts., 5 each.
2. What is meant by the terms "early hour," "calm cell," as used above? 5 pts., 5 each.
3. What is meant by "sit the fire out," "go starved to bed?"
4. Select five words as a lesson in spelling and definition, giving reasons for your selection. 5 pts., 2 each.
5. Express briefly, in your own words, the sentiment of the foregoing extract.

Let the candidate read a selection at sight, upon which he shall be marked according to the judgment of the Superintendent, from 1 to 50.

ARITHMETIC.

1. Divide the L. C. M. of 40, 45, 54, 72, and 135, by the G. C. D. of 620, and 1,116. Ans. 10.
2. Reduce 4897 gr. Troy to pounds. By analysis. Anal. 5; ans. 5.
3. If it takes a man $\frac{3}{4}$ of a day to mow an acre of grass, how long will it take him to mow $\frac{7}{10}$ of an acre? By analysis. Anal. 5; ans. 5.
4. If wheat yields 72% of its weight in flour, how much flour can be made from 245 bushels of wheat? Proc. 5; ans. 5.
5. Define *corporation* and *usury*. 2 pts., 5 each.
6. What is the present worth of a note for \$675, due in five months, and without interest, money being worth 7% per annum? Proc. 5; ans. 5.
7. If .63 gal. of wine cost \$1.47, what will $\frac{3}{10}$ gal. cost? By proportion. Proc. 5; ans. 5.
8. In a granary is a bin $12\frac{3}{4}$ ft. long, 8 ft. 7 in. wide, and 5.4 feet deep. How many bushels of grain will it hold? Proc. 5; ans. 5.
9. My house is 24 feet wide, the ridge which is in the middle of the roof is 9 feet higher than the side walls, and the eaves project 1 ft. 6 in. beyond the sides of the house. How wide is each side of the roof? Proc. 5; ans. 5.
10. Separate 75,686,967 into three equal factors. Proc. 5; ans. 5.

GRAMMAR.

1. Why is the sentence: "He ought to have went," incorrect? 10.
2. In the sentence: "The prophets, do they live forever?" Parse *prophets*. 10.
3. What is the difference between an adjective and an adverb. Illustrate. 2 pts., 5 each.
4. Give a list of ten words commonly used as prepositions. 10.
5. Write a sentence having for its predicate the *passive, potential, present, third plural* form of the verb *see*. 10.
6. Analyze: "The use of the dictionary should be insisted upon in the case of all pupils of sufficient maturity." 10.
7. What is the difference in the proper use of the relatives *who, which* and *that*? 10.
8. How may a declarative sentence be made interrogative? 10.
9. Correct: *If I was a teacher I would give shorter lessons*, and give the reason for the change. 2 pts., 5 each.
10. Name the parts of speech not found in the following sentence: "Millions of spiritual creatures walk the earth unseen, both when we wake and when we sleep." 10.

GEOGRAPHY.

1. Define Zone, declination of Axis. 2 pts., 5 each.
2. How are islands divided? What is the general position of each kind? 3 pts., 4 off for each error.
3. Describe the formation of an iceberg, from the falling of the snow? 10.

4. Dividing the United States into highlands and lowlands, in which division do most of the states lie? in which, most of the territories?

2 pts., 5 each.

5. Name the chief difference between the coal fields of eastern and western Pennsylvania?

6. From what two States was the District of Columbia originally taken? What was its original area? To what State was the portion originally given by it receded?

3 pts., 2 off for each error.

7. What countries constitute Great Britain? which is the largest? which, the smallest?

3 pts., 4 off for each error.

8. In sailing down the Danube from its source, what three important cities will you pass?

3 pts., 4 off for each error.

9. From what countries do we receive our principal supplies of spices?

2 pts., 5 each.

10. On which side of the Pyrenees is the climate the warmer? Why?

2 pts., 5 each.

HISTORY.

1. What can you say about the early voyages of the Northmen to this country?

10.

2. After the Northmen (a) Who first certainly discovered the North American continent? (b) in what year?

a=6; b=4.

3. Narrate the early history of Pennsylvania.

10.

4. (a) What was the Northwest Territory, and (b) how did it pass into the possession of the United States?

a=3; b=7.

5. What were the main provisions of the ordinance of 1787?

10.

6. Who was William Henry Harrison?

10.

7. Name the five greatest deceased Statesmen of the United States?

5 pts., 2 each.

8. What are the three greatest practical inventions of the last fifty years?

3 pts., 4 off for each error.

9. In what way were the boundaries between the United States and the British Possessions determined?

10.

10. How was Slavery abolished in the United States?

10.

NOTE.—Narratives and descriptions are not to exceed six lines each.

PHYSIOLOGY.

1. How many bones in the spinal column; and how are they separated?

2 pts., 5 each.

2. What is the function of the synovial membrane?

10.

3. Give two of the uses of the muscles?

2 pts., 5 each.

4. How many pairs of glands constitute the salivary glands? Where is each pair located?

2 pts., 5 each.

5. What organ secretes the bile? What the pancreatic juice?

6. Why does the system require more food in winter than in summer?

10.

7. What changes in food occur in the intestines?

10.

8. Why is the heart double? What is the function of each part? 2 pts., 5 each.
9. What is the pleura? 10.
10. Why should school-rooms be well ventilated? 10.

THEORY AND PRACTICE.

1. Why does the writing of words assist in learning their spelling? 20.
2. Give three of the aims of a good primary drill in reading. 20.
3. State the advantages and the disadvantages of the practice of permitting pupils to recite by turn.
4. What is the distinction between natural and artificial incentives? 20.
5. What is the great end of punishment in school? Why? 2 pts., 10 each.

ANSWERS TO STATE BOARD QUESTIONS FOR MAY, 1880.

IN SPECIAL CHARGE OF ANNIE M. SHERRILL.

The Number of the Answer Corresponds to the Number of the Question.

WRITING.

1. Two spaces, or two-thirds the length of the letter. Two: Right and left.
2. The small letter *x*. The shortest letters.
4. It gives a drill in movement and impresses the forms of the letters on the mind.

ORTHOGRAPHY.

1. A sub-vocal is a tone of the voice greatly modified, or interrupted by the organs of speech, while an aspirate is a mere breathing more or less modified by the organs of speech.
2. I, *long*, as in Ice.
I, *short*, as in Ill.
I, like long e, as in Pique.
I, like e, as in Irksome.
3. Su'per-in-tend'ent; Es-pe'cial-ly.
4. When the singular of a noun ends in *y* preceded by a vowel the plural is regularly formed by adding *s* only.

ARITHMETIC.

1. L. C. M. of 40, 45, 54, 72, $135=2160$; G. C. D. of 620 and $1,116=124$.
 $2160 \div 124 = 17\frac{11}{12}$.
2. 1 lb Troy $= 5760$ gr. In 4897 gr. there are as many lbs as 5760 is contained times in $4897 = 1\frac{11}{12}$ lb. Therefore, in 4897 gr. there are $1\frac{11}{12}$ lb. Troy.

3. To mow $\frac{7}{10}$ A. will require $\frac{7}{10}$ as much time as to mow 1 A. If he can mow 1 A. in $\frac{3}{4}$ da., he can mow $\frac{7}{10}$ of an A. in $\frac{7}{10}$ of $\frac{3}{4}$ da., = $\frac{21}{40}$ da.

Therefore, he can mow $\frac{7}{10}$ A. in $\frac{21}{40}$ da.

4. 1 bu. wheat = 60 lbs.

245 bu. wheat = 14700 lbs.

72% of 14700 lbs = 10584 lbs.

Therefore, 10584 lbs flour can be made from 245 bu. wheat yielding 72% in flour.

5. A corporation is a company having the capacity for legally transacting business as an individual. Usury is interest reckoned at a higher rate than the law allows.

6. Amt. of \$1.00 for five months at 7% = \$1.029125.

\$675 + 1.029125 = \$676.029125 = present worth \$675.

7. .63 gal. : $\frac{3}{8}$ gal. :: \$1.47 : (); $\frac{1.00}{.63} \times \frac{3}{8} \times \$1.47 = \frac{1.00}{.63} \times \frac{3}{8} \times \$1.47 = \$1.05$.

8. $\frac{3}{4}$ ft. $\times \frac{19}{2} \times \frac{1}{2} = 587.1$ cu. ft. 587.1 cu. ft. $\times 1728 = 645508.8$ cu. in.

$645508.8 \div 2150.42 = 301 =$ no. bu. contained in the granary.

9. The sides of the roof and the width of the house form a triangle from which the width of the sides of the roof may be determined. The base of the triangle is 24 ft., its perpendicular height 9 ft. The line which measures the altitude or perpendicular height divides it into two right angled triangles, having a base 12 ft. and a side 9 ft. to find the hypotenuse.

$12^2 + 9^2 = \text{Hypoth.}^2$ $144 \text{ ft.} + 81 \text{ ft.} = 225 \text{ ft.} = \text{Hypoth.}$ $\sqrt{225} = 15 \text{ ft.}$
Hypoth.; 15 ft. + 1 ft. 6 in. eaves, = $16\frac{1}{2}$ ft., = width of the side of the roof.

10. 75,686,967	423
64	4800
11686	240
10088	4
1598967	5044 Complete Div.
1598967	529200
	3780
	9
	532989 Complete Div.

Ans. Each factor = 423.

GRAMMAR.

1. Because the past form of the verb is used for the perfect participle.
2. Prophets is a noun, com., third, plural, nominative absolute by pleonasm. Rule: A noun or pronoun independent of sentential structure is in the nominative absolute.—*Holbrook*.

3. An adjective is a word which limits a noun or pronoun, while an adverb is a word which limits a verb, adjective or other adverb. A beautiful flower. That flower is very beautiful.

4. About, by, in, of, over, at, beyond, from, after, before.

5. They may be seen.

6. "The use of the dictionary should be insisted upon in the case of all pupils of sufficient maturity," is a simple, declarative sentence, of which 'the use of the dictionary' is the complex subject, of which 'use' is the simple subject modified first by 'The' a simple adjective element of the first class, and second by 'of the dictionary' a complex adjective element of the second class, of which 'dictionary' the noun of the base is modified by 'the' a simple adjective element of the first class. Of which sentence also, 'should be insisted upon in the case of all pupils of sufficient maturity' is the complex predicate of which 'should be insisted upon' is the simple predicate modified by 'in the case of all pupils of sufficient maturity' a complex adverbial element of the second class, of which 'case' the noun of the base is modified first by 'the' a simple adjective element of the first class and second by 'of all pupils of maturity' a complex adjective element of the second class, of which 'pupils' the noun of the base is modified first by 'all,' a simple adjective element of the first class and by 'of sufficient maturity' a complex adjective element of the second class, of which 'maturity' the noun of the base is modified by 'sufficient' a simple adjective element of the first class.

7. *Who* is used for persons only and objects personified; *Which* is used for brute animals and for inanimate things; *That* is used for persons, animals and things.

8. By placing the auxilliary before the verb.

9. If I *were* a teacher I would give shorter lessons. A mere supposition with indefinite time is best expressed by a verb in the subjunctive imperfect.—*Goold Brown*.

10. The Interjection.

GEOGRAPHY.

1. Zones are divisions of the earth's surface parallel to the equator and bounded by the tropic's and polar circles. The works on Geography in speaking of the earth's axis being placed at an angle with the plane of its orbit use the term *inclination*. The term *declination* as used in Astronomy means the angular distance of any object from the celestial equator either northward or southward.

2. Islands are divided into Oceanic and Continental. The Oceanic islands are found at a distance from the coasts of the continents in the midst of an ocean. The Continental islands are found near the coasts and seem to be of a similar formation.

3. The snow falls upon the mountains and being drifted by the winds fills up valleys at the foot of the highest spurs where by its own weight and the partial melting it becomes compact as ice. It is then called a glacier and is carried down the mountain sides by the force of gravitation, breaks off and plunges into the sea and floats away as an iceberg.

4. Most of the States lie in the lowland division and the most of the territories in the highland division.

5. The eastern coal fields contain anthracite coal and the western bituminous coal.
6. Virginia and Maryland. Its original area was 100 square miles, Virginia.
7. England, Scotland and Wales. England is the largest and Wales the smallest.
8. Vienna, Pesth and Belgrade.
9. From the West Indies, South America and the East Indies.
10. There seems to be very little difference between the temperatures of the portions of France and Spain bordering on the Pyrenees. The highlands of Spain are subject to great extremes of temperature while southern France is mild. It would seem that the proximity of the ocean and Mediterranean Sea would have more effect upon the climate of France and Spain than the Pyrenees Mountains.

HISTORY.

1. The Western Continent was first seen by white men in A. D. 986. A Norse navigator by the name of Herjulfson, sailing from Iceland to Greenland, was caught in a storm and driven westward to Newfoundland or Labrador. Two or three times the shores were seen but no landing was made or attempted. Fourteen years later, the actual discovery of America was made by Leif Erickson. Resolving to know the truth about the country which Herjulfson had seen, he sailed westward from Greenland, and in the spring of the year 1001 reached Labrador. In the years that followed Leif Erickson's discovery, other companies of Norsemen came to the shores of America.—*Ridpath*.
2. The Welsh people have a tradition to the effect that Madoc, one of their chieftains made a voyage to this country about the year 1200, but it was reserved to Christopher Columbus in 1492, to make the great discovery and open up the way to its colonization by Europeans.
3. Wm. Penn in 1681 received a charter from Charles II of England, granting him a large tract of land extending from the Delaware river west through five degrees of longitude and over three degrees of latitude. This he named Pennsylvania and in 1682 brought over a company of emigrants. He established friendly relations with the Indians, laid out the city of Philadelphia and soon there was a prosperous and rapidly growing colony.
4. The region north of the Ohio River was organized under the name of the Northwest Territory in 1787. It was part of the territory acceded to the U. S. at the close of the Revolutionary war.
5. Virginia by this ordinance ceded to the United States the territory now occupied by the states of Ohio, Indiana, Illinois, Wisconsin and Michigan. The ordinance provided for the government of the territory temporarily as one district but subject to be divided by Congress which was to appoint a Governor who should serve for three years, Judges, Legislative Council, Secretary and other necessary officers. It also provided for freedom of religious worship, the right of trial by jury, encouragement of

schools and education, and prohibited Slavery. It was also a provision that it should be divided into not more than five nor less than three states.

6. William Henry Harrison, known as the "Hero of Tippecanoe" and the President who lived but one month after his inauguration, was born in Virginia in 1773. At the age of 18 he served under St. Clair and Wayne in their campaigns against the Indians, was governor of Indian Territory from 1800 to 1812, distinguished himself in the battle of Tippecanoe, 1801, and in the battle of the Thames in 1812. In 1816 he was elected a member of Congress from Ohio and in 1828 was appointed minister to the republic of Colombia. In 1836 was defeated by Van Buren for President. In 1840 was elected to the Presidency, inaugurated March 4, 1841 and died on the 4th of April following.

7. Daniel Webster, Henry Clay, John C. Calhoun, Chas. Sumner, and Oliver P. Morton.

8. The electric telegraph, the sewing machine and the art of vulcanizing india rubber.

9. Partly by the treaty of 1783 and finally by the Ashburton-Webster treaty of 1842.

10. By a proclamation of President Lincoln.

PHYSIOLOGY

1. There are 25 bones in the spinal column separated by cushions of cartilage.

2. The synovial membrane contains a fluid called synovia the use of which is to lubricate the joints and lessen friction.

3. To produce motion and to hold the limbs in position.

4. The parotid glands, located behind the angles of the jaws, the sub-maxillary, below the jaws and the sublingal, beneath the tongue.

5. The liver. The pancreas.

6. The system requires more food in winter than in summer because it is necessary in addition to supplying the waste of the system that an extra amount of heat be produced to maintain the normal temperature.

7. The fatty and albuminous portions of the food are dissolved.

8. To keep the venous and arterial blood separate, the circulation being double, i. e. to the general system for nutrition and to the lungs for purification. The right side of the heart receives the venous blood and propels it to the lungs. The left side receives the arterial blood and propels it to the body.

9. The pleura is the membrane surrounding the lungs.

10. School-rooms should be well ventilated because the health of the pupils and teacher depends largely upon it.

THEORY AND PRACTICE.

1. We form a picture of the word in our minds by seeing it written and thus the memory is aided. Also as we must go through the mental operation of spelling the words in writing them this exercise helps to fix them in the memory.

2. (1) The cultivation of pure tones and natural delivery, (2) to increase the power of grasping thought, (3) to teach good manners or the art of appearing well.

3. We can not see any particular advantage in requiring pupils to recite by turns and the disadvantages are that it is much more difficult to secure attention and pupils are apt to prepare their lessons expecting to be called on for some particular part thus giving the opportunity of shirking work.

4. Natural incentives are such as arise from the nature of the subject, as the gratification of a natural curiosity and the desire for knowledge for its own sake. Artificial incentives may be such as are derived from the circumstances connected with the subject, as the approbation of the teacher, parents and friends or the desire of gain.

5. The great end of punishment everywhere should be to reform and better the condition of the offender.

COLLEGE DEPARTMENT.

DEVOTED TO THE INTERESTS OF THE CENTRAL NORMAL,
DANVILLE, INDIANA.

CONDUCTED BY G. DALLAS LIND.

DEAR FRIENDS:—Since our last writing the hand of death has come among us. Let the following resolutions tell the sad story:

DANVILLE, IND., May 2, 1880.

Again we are reminded by the untimely death of our friend, M. L. Sexton, that "here we have no continuing city." In his short stay with us, although during most of the time he was confined to the sick room, we discovered in his character the elements of a true, noble manhood.

Always social, kind, cheerful and grateful for the favors of his friends, he won the respect and good will of all. Therefore,

Resolved, That we, the faculty and students of the Central Normal College extend our warmest sympathies to the bereaved parents and friends who were denied the mournful pleasure of attending him in his last moments. May the kind Father of us all, who comforts and sustains the stranger, uphold them and give them solace in this hour of their great affliction.

Resolved, That a copy of these resolutions be sent to the parents and friends of the deceased.

A. KATE HURON,	} Committee.
ETHAN A. MILES,	
J. T. SHUTE.	

Mr. Sexton's home was in eastern Kentucky and owing to a want of railroad and telegraphic communication his parents and friends could not be

apprised of his condition in time to reach him before his death. The remains were immediately sent to his home.

Although away from home he was among true, kindhearted friends who did all that could have been done to ameliorate his condition.

We have lately been informed also of the sad fate of another Normalite, Wm. Beery of Hocking Co., Ohio. We condense from a lengthy report clipped from the *Hocking Sentinel*, kindly furnished us by W. S. Tom, Scientific graduate of the class of 1878. It seems that while engaged in washing his buggy in the river an accident happened in which the buggy was overturned, the horse entangled in the harness and Mr. Berry thrown into the water and although there were a number of persons near he had sunk to rise no more before help could reach him. The *Hocking Sentinel* says: "Wm. Beery was about 25 years of age, and was one of the most popular and promising young men of our country. He was intelligent, enterprising, honorable, a teacher by profession and one of the best in the county." He attended the "National Normal" in 1875 and since then has been a part of two years in the Central Normal. Many who read this will remember the man.

J. P. Wright, our present Secretary has secured a position as Principal of the Patoka schools for next year.

F. F. Prigg is engaged to teach the Clayton schools next year.

Z. T. Dungan of Huntington, Ind., was married on the 11th of May to Miss Lina Close. He says he is preparing for the profession of Law and has been taking considerable part in politics. Says also that though he shall probably not attend the Normal any more, that he will continue to be a Normalite and closed with words of appreciation for THE NORMAL TEACHER.

Chas. M. Pickett, Groveland, Ind., is farming, has secured a school for next year and will be with us short term.

We made a mistake last month in speaking of the donor of the Geological specimens. It was David W. Hawkins. The specimens were very fine consisting of Minerals, Fossils and Indian relics. Prof. Adams has also made a purchase of a number of crinoids, geodes, &c., found in Jackson Co., Ind., also a number of corals and marine shells, some of them very fine.

The Geological and Botanical sections of the Natural Science department have been ransacking the region around Danville for specimens, breaking, collecting and classifying rocks, gathering, analyzing and preserving plants and you may look out for a fine display of their work at an Exposition which will occur at the close of the present term. In our next issue we will tell you what we saw at the Exposition. We will be modest and only say that we hope the students of all other schools are doing as much practical work in this and every other line as we think the students of this school are doing.

Dr. Tingley is building for the use of the school a mammoth electrical machine. The glass plate is over three feet in diameter. Come and see the thing work. It will be truly a "shocking" spectacle to behold.

PUBLISHER'S DEPARTMENT.

PLEASE read all of the new advertisements.

ALL those who think of making a club for this paper should read our new premium circular.

IF you do not wish to lose any numbers of THE NORMAL TEACHER, you should renew at once. We can not supply back numbers.

WE are offering great inducements to agents for our books and THE NORMAL TEACHER. Don't fail to write us for full particulars.

ALEX. C. HOPKINS, formerly State Supt. will do work in Co. Institutes this summer. Address him either at Kokomo or Danville, Ind.

S. L. MARROW & Co., Indianapolis, Ind., are offering agents the most liberal terms on their New Illustrated Indiana History, Historical Bibles, Voter's Text-Book, and other standard works.

THE Review term of the Central Normal College opens July 6th, 1880, and offers exceptional advantages in a general review of all the common school branches. We hope to see a large attendance.

GOLDEN DAYS for boys and girls is a new paper recently started. It is first-class in every respect and ought to have a million readers. Address the publisher, Jas. Elverson, S. W. Corner Eighth and Locust Sts., Philadelphia, Pa.

A GOOD many Institutes will meet in July and to one and all of our agents we say *push the work*. Don't fail to work early and late and success will crown your efforts. Hoping to hear from you often by letter we bid you good-bye until August.

TEACHERS who wish to become familiar with the *Normal principles of teaching*, who wish to keep posted in the *latest and best* methods of instruction, and who wish to have that which is *thoroughly practical*, should subscribe for THE NORMAL TEACHER.

IT beats the world how our books do sell. The Normal Question Book which has been out of press only nine months is now in its seventeenth edition. We do not believe that there is another book published in the United States that has had such a run the past year. Our other works only recently published are coming rapidly into general favor. We have arranged better terms than ever for agents on our books for the Institutes of 1880. It will pay you to write for our new circular.

OUR agents should not forget that THE NORMAL TEACHER has the largest circulation of any school journal in this country. That such circulation should be reached in a little over two years is certainly sufficient evidence of the immense popularity of a school journal.

SOME school journals recently started are *bragging* that they have reached a circulation of 800 in two months. THE NORMAL TEACHER in the first two months of its publication, March and April, 1878, received 1500 subscriptions. Our paper too was started in the midst of the "hard times."

WE have been receiving for some time *The School Visitor*, a monthly periodical devoted to the study of Mathematics and English Grammar. Price 60 cents a year. Published at Ansonia, O., by J. S. Royer. This monthly is well filled with interesting questions, answers and solutions. It will pay every teacher to take it.

WE have a new surprise in store for our readers which will appear in August number. We tried hard to get it ready for this issue but could not do it. We believe in improvement, and we are sure that all of our readers will agree with us that the August number is the finest in all respects of any number ever put out.

FROM present indications our books will have a wonderful sale at the Institutes this summer. To accommodate all of our agents and insure all against loss we have recently published a new circular to agents setting forth a new and original plan for working our publications at the Institutes. All should write for this circular.

WE call special attention to our advertising pages this month. Many new advertisements appear. If you would keep posted read all the advertisements. Many advertisements are left out of this issue for want of space. We only insert so many pages of advertisements each number and never allow the advertisements to encroach upon the reading matter.

WE offer THE NORMAL TEACHER at 75 cents in clubs of five. At this price it is by far the cheapest educational journal in the U. S. Once in a while some new journal starts up with a determination to compete with us but about second or third issue the sign is taken down and club rates are put at \$1.00 per copy. We hope that all those who think of raising a club for any school journal at the Institutes will remember that it is far easier to obtain a club of five at 75 cents each than it is to secure even one name for a journal that comes at \$1.00. Let all bear this fact in mind and send at once for our new premium circular which is far more extensive than that put out by any other educational publisher.

WHEREVER sample copies of THE NORMAL TEACHER have gone we have invariably received a club of subscriptions. Therefore we are anxious to send sample copies and circulars to every Institute in the Union and Canada. Will those who are interested in circulating first-class educational literature please write us for sample copies and our new premium circular.

THE CENTRAL NORMAL COLLEGE retains its old teachers for next year with strong and valuable additions. We have repeatedly called attention to this school in these pages and we wish to say again that all of our readers would do well to investigate the merits of this school before going elsewhere. There is certainly no Normal School in the land that does more for its students.

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T. N. JONES, Watchmaker and Jeweler; dealer in Watches, Clocks, Silverware, Spectacles and Fine Jewelry. East side Public Square, Danville, Indiana. Repairing of all kinds neatly executed and warranted. Teachers in need of watches and jewelry should write for prices.

THE NORMAL TEACHER.

VOL. III.

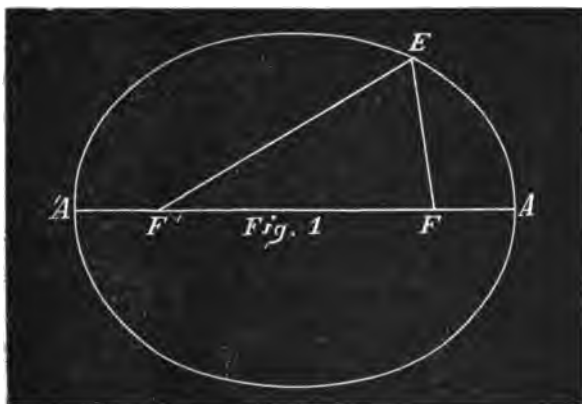
DANVILLE, IND., AUGUST, 1880.

No. 6.

Y MATHEMATICAL GEOGRAPHY.—NO. VII.

ELIAS SCHNEIDER.

After having spoken of the motions of the earth, we must next consider its position, both *where* it is situated in the plane of its orbit at any time and *how* it is there situated. It has already been remarked that the path of the earth's orbit around the sun, is the curve of an ellipse. The ellipse differs from the circle in having no point within it, equally distant from every point in the curve. But instead of this it has *two* points within it, the sum of whose distances from any point of the curve is constant and equal to its longest diameter.



Let Fig. 1 represent this orbit: The sum of the distances $EF + EF'$ is always equal to AA' no matter where the point E be taken. If this figure represent the earth's orbit, then either F' or F may represent the place where the sun is situated, while the earth E may be in any part of the curve. If the sun be at F' , then will the earth when at A' be nearest the sun or at its perihelion point; when at A it will be at its most remote point from the sun, or at its aphelion point. The earth is at its perihelion point, some where about the 1st of January. We are therefore nearest to the sun in winter and most remote from this luminary in summer. But the earth has not always had this position in its orbit. About 10,500 years ago astronomers tell us the earth was nearest to the sun in summer.

Now let us see *how* the earth is situated in its orbit, for upon this depends the nature of our seasons. Our school geographies tell us that the revolution of the earth around the sun causes the change of seasons. This is not strictly correct. The change of seasons is produced by the inclination of the earth's equator to the ecliptic, or by the inclination of the earth's axis to the plane of its orbit. This inclination is also changing. About 2,088 years ago it was about $23' 48''$ more than at present. At this rate of decrease of about half a second a year, the equator and ecliptic would coincide in about 85,000 years, and the order of things would be entirely changed. The sun would always be overhead at the equator and there would be no change of seasons. But astronomers tell us that there is no danger of this kind to be apprehended; that this change can not extend in either way to more than three or four degrees.

Let us now see *how* the position of the earth, in its orbit, produces a change of seasons:

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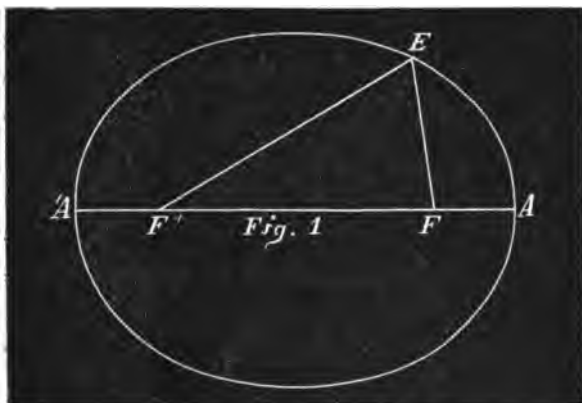
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either at the vernal or autumnal equinox, the sun is overhead at the equator and days and nights are equal every where, except at the exact poles where the sun is seen moving just along the edge of the horizon.

It can be very readily seen from Fig. 2 how the change of seasons is caused by the inclination of the axis of the earth to the plane of its orbit; and that, if this axis were perpendicular to the plane A B, the sun would be always overhead at the equator and that there could then be no change of seasons. It can also be seen that the positions of the tropics and of the polar circles are determined by the inclination of the earth's axis. As this inclination has decreased about 23' 48" since the first measure was made by Eratosthenes, about 2,088 years ago, the sun must have traveled nearly 30 miles farther north and so many miles farther south at that time than it does now. Therefore, the tropics were so many miles farther north and south of the equator, and the polar circles as many miles farther from the poles. Should astronomers be mistaken in regard to the limit of this change, then there was a time when the sun traveled up to the north and down to the south pole. Those points experienced, under such a supposition, the most intense degrees of heat and cold. The sun must have stood overhead for weeks, the day lasting, not only six months, but the sun pouring its vertical rays continuously for several weeks, with intense heat upon the earth below and driving with immense power from the poles, the ice formed during the intense cold which prevailed when the seasons were reversed, must have produced an influence beyond endurance.

You should rest the mind rather by a variety in your studies than by cessation from study.

EDUCATION is not creative; it only assists in developing existing possibilities into realities.—*Brooks*.

ELECTRIC EXPERIMENTS.

J. E. BAKER.

Action of Points—Lightning-rods.—A practical illustration of the action of points is in the use of lightning-rods. Their usefulness consists in their capability of *silently* conducting (because they are pointed) the heavy charge of the cloud to the earth. In 1752 the illustrious Franklin proved that lightning was nothing more than an enormous spark of frictional electricity. This he demonstrated by means of a kite with a pointed wire attached to it. When the rain had dampened the hempen kite-string, rendering it a good conductor, he succeeded in getting sparks from a key attached to the string, the key being separated from him by a silk cord held in the hand. A leyden jar was also charged by holding the knob to the key.

Charge a leyden jar and instead of presenting the knuckle present the point of a fine needle to the knob, the jar will be silently discharged. The object of the pointed lightning conductors is to silently discharge the heavily charged cloud. If the conductors were not pointed there would be a spark or flash, which is of course liable to produce fire. When the heavily charged cloud is near the earth, by induction it becomes oppositely charged and we have a leyden jar on a large scale the cloud acting the same as one coat of the jar and the ground as the other. When the cloud comes near a building an enormous spark is produced unless the building be *well supplied* with pointed conductors.

The glass insulators connecting the rods and building are evidently a sham and a deception because both glass and building become damp or wet during a rain and as water is a good conductor (as shown in No. 2, Vol. III, p. 49 of THE NORMAL TEACHER), the building possesses about the same conductivity as the rods do. If anything the use of the glass increases the danger from the fact that the glass does

not retain moisture like wood, consequently we have two conductors, the wet roof and rods, completely insulated, hence a spark may leap from the rod, penetrating the surface of the wetted roof and fire it.

Lightning is not electricity as some assert, it is however, the same as the electric spark; neither is this spark electricity, it is only the *result* of the molecular disturbance of the air particles through which the electricity passes. The irregular or zigzag appearance of the electric spark or the lightning flash is due to the electric current following the path offering the least resistance to its passage. Authors ascribe the source of atmospheric electricity to *combustion*, "*friction* of moving masses of air," and the inductive action of the earth. *Thunder* is nothing more than the sound resulting from the air rushing into the vacuum produced by the passage of the electric current.



Ignition of Candle or Alcohol Lamp.—To relight a candle or alcohol lamp, or to ignite alcohol forms a very interesting part of electric action, and splendidly shows the manner in which combustibles are set on fire by the flash of lightning during a thunder storm. It is a good experiment to per-

form and an excellent subject to enlist the attention of pupils in the study of every-day facts.

Twist a small piece of paper, previously wetted, on one end of a door key. Hold the key, thus prepared, in one hand and a charged jar in the other bringing the twist of paper and knob of the jar over the wick of a recently blown out candle, which will be relighted when the spark leaps from the knob to the wet paper, Fig. 5. An alcohol lamp can easily be made by taking a morphine or ink bottle with a loosely fitting cork which contains a hole some larger than a lead pencil into which is inserted a tin tube made by bending a piece of tin round a lead pencil. Put in the tube a wick and fill the bottle with alcohol. Light the lamp and after it burns awhile blow out and operate the same as with the candle.



Ignition Cup.—Some glass cup or vessel is necessary in igniting alcohol or powder. With an average amount of patience and pluck one can be made with an old bottle. Take a quinine bottle or one having the same diameter whose bottom is *much* depressed, as it is the bottom which is to form the cup to hold the alcohol. About two inches from the bottom wrap a yarn string, previously

soaked with coal oil. Set the string on fire and after burning awhile suddenly cool by plunging in water which will cause the bottom to drop off. With a round file, kept moist with alcohol, a round hole can be drilled in the bottom. Also drill one in the middle of one side. The holes should be nearly as large as a lead pencil. Take a wire (part of a bucket bail) about three inches long, bend a small portion of one end at right angles, fasten a bullet to this end; now this end having the bullet on put through the side hole and *in* the center hole. The wire and bullet may be held permanently in this posi-

3. To mow $\frac{7}{10}$ A. will require $\frac{7}{10}$ as much time as to mow 1 A. If he can mow 1 A. in $\frac{3}{4}$ da., he can mow $\frac{7}{10}$ of an A. in $\frac{7}{10}$ of $\frac{3}{4}$ da., = $\frac{21}{40}$ da.

Therefore, he can mow $\frac{7}{10}$ A. in $\frac{21}{40}$ da.

4. 1 bu. wheat = 60 lbs.

245 bu. wheat = 14700 lbs.

72% of 14700 lbs = 10584 lbs.

Therefore, 10584 lbs flour can be made from 245 bu. wheat yielding 72% in flour.

5. A corporation is a company having the capacity for legally transacting business as an individual. Usury is interest reckoned at a higher rate than the law allows.

6. Amt. of \$1.00 for five months at 7% = \$1.0291 $\frac{2}{3}$.

\$675 + 1.0291 $\frac{2}{3}$ = $\frac{10087}{100}$ = \$656 = present worth \$675.

7. .63 gal. : $\frac{1}{10}$ gal. :: \$1.47 : () ; $\frac{100}{10} \times \frac{1}{10} \times \$1.47 = \frac{147}{100} = \1.05 .

8. $\frac{4}{3}$ ft. $\times \frac{100}{10} \times \frac{1}{4} = 587.1$ cu. ft. 587.1 cu. ft. $\times 1728 = 645508.8$ cu. in.

$645508.8 \div 2150.42 = 30 \frac{1}{2}$ = no. bu. contained in the granary.

9. The sides of the roof and the width of the house form a triangle from which the width of the sides of the roof may be determined. The base of the triangle is 24 ft., its perpendicular height 9 ft. The line which measures the altitude or perpendicular height divides it into two right angled triangles, having a base 12 ft. and a side 9 ft. to find the hypotheneuse.

$12 \text{ ft.}^2 + 9 \text{ ft.}^2 = \text{Hypoth.}^2$ $144 \text{ ft.} + 81 \text{ ft.} = 225 \text{ ft.} = \text{Hypoth.}$ $\sqrt{225} = 15 \text{ ft.}$
Hypoth.; 15 ft. + 1 ft. 6 in. eaves, = 16 $\frac{1}{2}$ ft., = width of the side of the roof.

10. 75,686,967	423	
64		
11686	4800	
10088	240	
		4
1598967	5044	Complete Div.
1598967	529200	
		3780
		9
		532989
		Complete Div.

Ans. Each factor = 423.

GRAMMAR.

1. Because the past form of the verb is used for the perfect participle.

2. Prophets is a noun, com., third, plural, nominative absolute by pleonasm. Rule: A noun or pronoun independent of sentential structure is in the nominative absolute.—*Holbrook*.

3. An adjective is a word which limits a noun or pronoun, while an adverb is a word which limits a verb, adjective or other adverb. A beautiful flower. That flower is very beautiful.

4. About, by, in, of, over, at, beyond, from, after, before.

5. They may be seen.
6. "The use of the dictionary should be insisted upon in the case of all pupils of sufficient maturity," is a simple, declarative sentence, of which 'the use of the dictionary' is the complex subject, of which 'use' is the simple subject modified first by 'The' a simple adjective element of the first class, and second by 'of the dictionary' a complex adjective element of the second class, of which 'dictionary' the noun of the base is modified by 'the' a simple adjective element of the first class. Of which sentence also, 'should be insisted upon in the case of all pupils of sufficient maturity' is the complex predicate of which 'should be insisted upon' is the simple predicate modified by 'in the case of all pupils of sufficient maturity' a complex adverbial element of the second class, of which 'case' the noun of the base is modified first by 'the' a simple adjective element of the first class and second by 'of all pupils of maturity' a complex adjective element of the second class, of which 'pupils' the noun of the base is modified first by 'all,' a simple adjective element of the first class and by 'of sufficient maturity' a complex adjective element of the second class, of which 'maturity' the noun of the base is modified by 'sufficient' a simple adjective element of the first class.
7. *Who* is used for persons only and objects personified; *Which* is used for brute animals and for inanimate things; *That* is used for persons, animals and things.
8. By placing the auxilliary before the verb.
9. If I *were* a teacher I would give shorter lessons. A mere supposition with indefinite time is best expressed by a verb in the subjunctive imperfect.—*Goold Brown*.
10. The Interjection.

GEOGRAPHY.

1. Zones are divisions of the earth's surface parallel to the equator and bounded by the tropic's and polar circles. The works on Geography in speaking of the earth's axis being placed at an angle with the plane of its orbit use the term *inclination*. The term *declination* as used in Astronomy means the angular distance of any object from the celestial equator either northward or southward.
2. Islands are divided into Oceanic and Continental. The Oceanic islands are found at a distance from the coasts of the continents in the midst of an ocean. The Continental islands are found near the coasts and seem to be of a similar formation.
3. The snow falls upon the mountains and being drifted by the winds fills up valleys at the foot of the highest spurs where by its own weight and the partial melting it becomes compact as ice. It is then called a glacier and is carried down the mountain sides by the force of gravitation, breaks off and plunges into the sea and floats away as an iceberg.
4. Most of the States lie in the lowland division and the most of the territories in the highland division.

5. The eastern coal fields contain anthracite coal and the western bituminous coal.
6. Virginia and Maryland. Its original area was 100 square miles, Virginia.
7. England, Scotland and Wales. England is the largest and Wales the smallest.
8. Vienna, Pesth and Belgrade.
9. From the West Indies, South America and the East Indies.
10. There seems to be very little difference between the temperatures of the portions of France and Spain bordering on the Pyrenees. The highlands of Spain are subject to great extremes of temperature while southern France is mild. It would seem that the proximity of the ocean and Mediterranean Sea would have more effect upon the climate of France and Spain than the Pyrenees Mountains.

HISTORY.

1. The Western Continent was first seen by white men in A. D. 986. A Norse navigator by the name of Herjulfson, sailing from Iceland to Greenland, was caught in a storm and driven westward to Newfoundland or Labrador. Two or three times the shores were seen but no landing was made or attempted. Fourteen years later, the actual discovery of America was made by Leif Erickson. Resolving to know the truth about the country which Herjulfson had seen, he sailed westward from Greenland, and in the spring of the year 1001 reached Labrador. In the years that followed Leif Erickson's discovery, other companies of Norsemen came to the shores of America.—*Ridpath.*

2. The Welsh people have a tradition to the effect that Madoc, one of their chieftains made a voyage to this country about the year 1200, but it was reserved to Christopher Columbus in 1492, to make the great discovery and open up the way to its colonization by Europeans.

3. Wm. Penn in 1681 received a charter from Charles II of England, granting him a large tract of land extending from the Delaware river west through five degrees of longitude and over three degrees of latitude. This he named Pennsylvania and in 1682 brought over a company of emigrants. He established friendly relations with the Indians, laid out the city of Philadelphia and soon there was a prosperous and rapidly growing colony.

4. The region north of the Ohio River was organized under the name of the Northwest Territory in 1787. It was part of the territory acceded to the U. S. at the close of the Revolutionary war.

5. Virginia by this ordinance ceded to the United States the territory now occupied by the states of Ohio, Indiana, Illinois, Wisconsin and Michigan. The ordinance provided for the government of the territory temporarily as one district but subject to be divided by Congress which was to appoint a Governor who should serve for three years, Judges, Legislative Council, Secretary and other necessary officers. It also provided for freedom of religious worship, the right of trial by jury, encouragement of

schools and education, and prohibited Slavery. It was also a provision that it should be divided into not more than five nor less than three states.

6. William Henry Harrison, known as the "Hero of Tippecanoe" and the President who lived but one month after his inauguration, was born in Virginia in 1773. At the age of 18 he served under St. Clair and Wayne in their campaigns against the Indians, was governor of Indian Territory from 1800 to 1812, distinguished himself in the battle of Tippecanoe, 1801, and in the battle of the Thames in 1812. In 1816 he was elected a member of Congress from Ohio and in 1828 was appointed minister to the republic of Colombia. In 1836 was defeated by Van Buren for President. In 1840 was elected to the Presidency, inaugurated March 4, 1841 and died on the 4th of April following.

7. Daniel Webster, Henry Clay, John C. Calhoun, Chas. Sumner, and Oliver P. Morton.

8. The electric telegraph, the sewing machine and the art of vulcanizing india rubber.

9. Partly by the treaty of 1783 and finally by the Ashburton-Webster treaty of 1842.

10. By a proclamation of President Lincoln.

PHYSIOLOGY

1. There are 25 bones in the spinal column separated by cushions of cartilage.

2. The synovial membrane contains a fluid called synovia the use of which is to lubricate the joints and lessen friction.

3. To produce motion and to hold the limbs in position.

4. The parotid glands, located behind the angles of the jaws, the sub-maxillary, below the jaws and the sublingal, beneath the tongue.

5. The liver. The pancreas.

6. The system requires more food in winter than in summer because it is necessary in addition to supplying the waste of the system that an extra amount of heat be produced to maintain the normal temperature.

7. The fatty and albuminous portions of the food are dissolved.

8. To keep the venous and arterial blood separate, the circulation being double, i. e. to the general system for nutrition and to the lungs for purification. The right side of the heart receives the venous blood and propels it to the lungs. The left side receives the arterial blood and propels it to the body.

9. The pleura is the membrane surrounding the lungs.

10. School-rooms should be well ventilated because the health of the pupils and teacher depends largely upon it.

THEORY AND PRACTICE.

1. We form a picture of the word in our minds by seeing it written and thus the memory is aided. Also as we must go through the mental operation of spelling the words in writing them this exercise helps to fix them in the memory.

2. (1) The cultivation of pure tones and natural delivery, (2) to increase the power of grasping thought, (3) to teach good manners or the art of appearing well.

3. We can not see any particular advantage in requiring pupils to recite by turns and the disadvantages are that it is much more difficult to secure attention and pupils are apt to prepare their lessons expecting to be called on for some particular part thus giving the opportunity of shirking work.

4. Natural incentives are such as arise from the nature of the subject, as the gratification of a natural curiosity and the desire for knowledge for its own sake. Artificial incentives may be such as are derived from the circumstances connected with the subject, as the approbation of the teacher, parents and friends or the desire of gain.

5. The great end of punishment everywhere should be to reform and better the condition of the offender.

COLLEGE DEPARTMENT.

DEVOTED TO THE INTERESTS OF THE CENTRAL NORMAL,
DANVILLE, INDIANA.

CONDUCTED BY G. DALLAS LIND.

DEAR FRIENDS:—Since our last writing the hand of death has come among us. Let the following resolutions tell the sad story:

DANVILLE, IND., May 2, 1880.

Again we are reminded by the untimely death of our friend, M. L. Sexton, that "here we have no continuing city." In his short stay with us, although during most of the time he was confined to the sick room, we discovered in his character the elements of a true, noble manhood.

Always social, kind, cheerful and grateful for the favors of his friends, he won the respect and good will of all. Therefore,

Resolved, That we, the faculty and students of the Central Normal College extend our warmest sympathies to the bereaved parents and friends who were denied the mournful pleasure of attending him in his last moments. May the kind Father of us all, who comforts and sustains the stranger, uphold them and give them solace in this hour of their great affliction.

Resolved, That a copy of these resolutions be sent to the parents and friends of the deceased.

A. KATE HURON, }
ETHAN A. MILES, } Committee.
J. T. SHUTE. }

Mr. Sexton's home was in eastern Kentucky and owing to a want of railroad and telegraphic communication his parents and friends could not be

apprised of his condition in time to reach him before his death. The remains were immediately sent to his home.

Although away from home he was among true, kindhearted friends who did all that could have been done to ameliorate his condition.

We have lately been informed also of the sad fate of another Normalite, Wm. Beery of Hocking Co., Ohio. We condense from a lengthy report clipped from the *Hocking Sentinel*, kindly furnished us by W. S. Tom, Scientific graduate of the class of 1878. It seems that while engaged in washing his buggy in the river an accident happened in which the buggy was overturned, the horse entangled in the harness and Mr. Berry thrown into the water and although there were a number of persons near he had sunk to rise no more before help could reach him. The *Hocking Sentinel* says: "Wm. Beery was about 25 years of age, and was one of the most popular and promising young men of our country. He was intelligent, enterprising, honorable, a teacher by profession and one of the best in the county." He attended the "National Normal" in 1875 and since then has been a part of two years in the Central Normal. Many who read this will remember the man.

J. P. Wright, our present Secretary has secured a position as Principal of the Patoka schools for next year.

F. F. Prigg is engaged to teach the Clayton schools next year.

Z. T. Dungan of Huntington, Ind., was married on the 11th of May to Miss Lina Close. He says he is preparing for the profession of Law and has been taking considerable part in politics. Says also that though he shall probably not attend the Normal any more, that he will continue to be a Normalite and closed with words of appreciation for THE NORMAL TEACHER.

Chas. M. Pickett, Groveland, Ind., is farming, has secured a school for next year and will be with us short term.

We made a mistake last month in speaking of the donor of the Geological specimens. It was David W. Hawkins. The specimens were very fine consisting of Minerals, Fossils and Indian relics. Prof. Adams has also made a purchase of a number of crinoids, geodes, &c., found in Jackson Co., Ind., also a number of corals and marine shells, some of them very fine.

The Geological and Botanical sections of the Natural Science department have been ransacking the region around Danville for specimens, breaking, collecting and classifying rocks, gathering, analyzing and preserving plants and you may look out for a fine display of their work at an Exposition which will occur at the close of the present term. In our next issue we will tell you what we saw at the Exposition. We will be modest and only say that we hope the students of all other schools are doing as much practical work in this and every other line as we think the students of this school are doing.

Dr. Tingley is building for the use of the school a mammoth electrical machine. The glass plate is over three feet in diameter. Come and see the thing work. It will be truly a "shocking" spectacle to behold.

PUBLISHER'S DEPARTMENT.

PLEASE read all of the new advertisements.

ALL those who think of making a club for this paper should read our new premium circular.

IF you do not wish to lose any numbers of *THE NORMAL TEACHER*, you should renew at once. We can not supply back numbers.

WE are offering great inducements to agents for our books and *THE NORMAL TEACHER*. Don't fail to write us for full particulars.

ALEX. C. HOPKINS, formerly State Supt. will do work in Co. Institutes this summer. Address him either at Kokomo or Danville, Ind.

S. L. MARROW & Co., Indianapolis, Ind., are offering agents the most liberal terms on their New Illustrated Indiana History, Historical Bibles, Voter's Text-Book, and other standard works.

THE Review term of the Central Normal College opens July 6th, 1880, and offers exceptional advantages in a general review of all the common school branches. We hope to see a large attendance.

GOLDEN DAYS for boys and girls is a new paper recently started. It is first-class in every respect and ought to have a million readers. Address the publisher, Jas. Elverson, S. W. Corner Eighth and Locust Sts., Philadelphia, Pa.

A GOOD many Institutes will meet in July and to one and all of our agents we say *push the work*. Don't fail to work early and late and success will crown your efforts. Hoping to hear from you often by letter we bid you good-bye until August.

TEACHERS who wish to become familiar with the *Normal principles of teaching*, who wish to keep posted in the *latest and best* methods of instruction, and who wish to have that which is *thoroughly practical*, should subscribe for *THE NORMAL TEACHER*.

IT beats the world how our books do sell. The Normal Question Book which has been out of press only nine months is now in its seventeenth edition. We do not believe that there is another book published in the United States that has had such a run the past year. Our other works only recently published are coming rapidly into general favor. We have arranged better terms than ever for agents on our books for the Institutes of 1880. It will pay you to write for our new circular.

OUR agents should not forget that THE NORMAL TEACHER has the largest circulation of any school journal in this country. That such circulation should be reached in a little over two years is certainly sufficient evidence of the immense popularity of a school journal.

SOME school journals recently started are *bragging* that they have reached a circulation of 800 in two months. THE NORMAL TEACHER in the first two months of its publication, March and April, 1878, received 1500 subscriptions. Our paper too was started in the midst of the "hard times."

WE have been receiving for some time *The School Visitor*, a monthly periodical devoted to the study of Mathematics and English Grammar. Price 60 cents a year. Published at Ansonia, O., by J. S. Royer. This monthly is well filled with interesting questions, answers and solutions. It will pay every teacher to take it.

WE have a new surprise in store for our readers which will appear in August number. We tried hard to get it ready for this issue but could not do it. We believe in improvement, and we are sure that all of our readers will agree with us that the August number is the finest in all respects of any number ever yet put out.

FROM present indications our books will have a wonderful sale at the Institutes this summer. To accommodate all of our agents and insure all against loss we have recently published a new circular to agents setting forth a new and original plan for working our publications at the Institutes. All should write for this circular.

WE call special attention to our advertising pages this month. Many new advertisements appear. If you would keep posted read all the advertisements. Many advertisements are left out of this issue for want of space. We only insert so many pages of advertisements each number and never allow the advertisements to encroach upon the reading matter.

WE offer THE NORMAL TEACHER at 75 cents in clubs of five. At this price it is by far the cheapest educational journal in the U. S. Once in a while some new journal starts up with a determination to compete with us but about second or third issue the sign is taken down and club rates are put at \$1.00 per copy. We hope that all those who think of raising a club for any school journal at the Institutes will remember that it is far easier to obtain a club of five at 75 cents each than it is to secure even one name for a journal that comes at \$1.00. Let all bear this fact in mind and send at once for our new premium circular which is far more extensive than that put out by any other educational publisher.

WHEREVER sample copies of THE NORMAL TEACHER have gone we have invariably received a club of subscriptions. Therefore we are anxious to send sample copies and circulars to every Institute in the Union and Canada. Will those who are interested in circulating first-class educational literature please write us for sample copies and our new premium circular.

THE CENTRAL NORMAL COLLEGE retains its old teachers for next year with strong and valuable additions. We have repeatedly called attention to this school in these pages and we wish to say again that all of our readers would do well to investigate the merits of this school before going elsewhere. There is certainly no Normal School in the land that does more for its students.

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Creates great interest in Schools, at Institutes, wherever used. Sent postpaid for Silver Quarter.

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Bible agents also wanted. Sample pages sent on receipt of application.

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THE NORMAL TEACHER.

VOL. III.

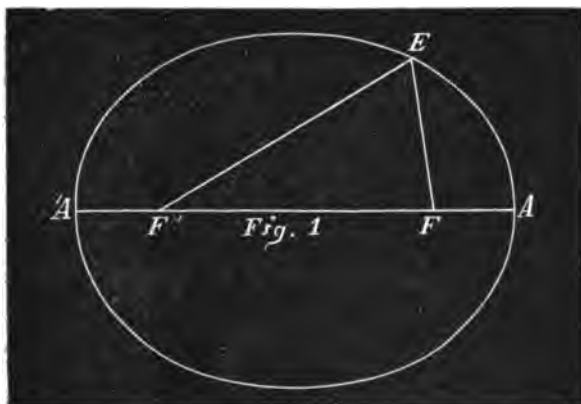
DANVILLE, IND., AUGUST, 1880.

No. 6.

✓ MATHEMATICAL GEOGRAPHY.—NO. VII.

ELIAS SCHNEIDER.

After having spoken of the motions of the earth, we must next consider its position, both *where* it is situated in the plane of its orbit at any time and *how* it is there situated. It has already been remarked that the path of the earth's orbit around the sun, is the curve of an ellipse. The ellipse differs from the circle in having no point within it, equally distant from every point in the curve. But instead of this it has *two* points within it, the sum of whose distances from any point of the curve is constant and equal to its longest diameter.



3. [Vol. III, No. 4, Q. 7, p. 149.]

How large is the side of a cubical box that can be made from a plank $4\frac{1}{2}$ ft. in length, 24 in. wide, and 3 in. thick?

Ans. Construct the box so that the top and bottom shall extend to the sides of the cube in all directions, and let the sides extend to the ends of the box.

Let x = one side of the box in inches, and let a = thickness of the plank. The area of one side of the box will be x^2 inches, and the total area $6x^2$ inches.

The area of the plank is 12168 inches; add to this the area of 8 edges, that are x inches long and " a " inches wide; and 4 edges that are $(x-2a)$ inches long and " a " inches wide, and we have $12168 + 12ax - 8a^2$ equal to the area of the box.

Hence, (1) $6x^2 = 12168 + 12ax - 8a^2$

$$(2) \quad x^2 - 2ax = \frac{12168 - 8a^2}{6} \text{ by transposing and reducing (1).}$$

$$(3) \quad x^2 - 2ax + a^2 = \frac{12168 - 2a^2}{6} \text{ by completing sq. of (2).}$$

$$(4) \quad x - a = \sqrt{\frac{12168 - 2a^2}{6}} \text{ by extracting sq. root (3).}$$

$$x = \sqrt{\frac{12168 - 2a^2}{6}} + a, \text{ by transposing } a \text{ in (4).}$$

From this may be derived the following general Rule: From the area of the plank take twice the square of its thickness, divide the remainder by 6; extract the square root of the quotient, and add the thickness of the plank to the root. The result is the length of the required cubical box.

By applying the foregoing rule, all problems of this class may be solved arithmetically. From the area of the plank, which is 12168 sq. inches, subtract twice the square of the thickness, which is 18 inches; divide the remainder by 6, and to the square root of the quotient, which is 45, add 3 inches the thickness of plank, and we have the length of the side of the required cubical box, which is 48 inches.

Illustration: It may be seen that a cubical box can be made of six square pieces of plank, except two corners, each of which will be a cube whose side will equal the thickness of the plank. Hence, from the area of the plank, in constructing the box, must be subtracted twice the area of a corner equal in length and width to the thickness of the plank.

B. B. LAKIN, *Streator, Ill.*

Solved correctly also by H. A. Withee, Chapin, Ill.—[Ed.]

4. [Vol. III, No. 4, Q. 8, p. 149.]

$29x^2 + 5x = 276$. Required the value of x .

Ans. By rule for Hindoo Formula, we get the following:

$$x = \frac{-5 \pm \sqrt{25 + 32016}}{58}; \text{ whence, } x = 3 \text{ or } -3\frac{1}{5}. \quad \text{D. C. JONES.}$$

Correctly solved also by B. B. Lakin, Streator, Ill.—[Ed.]

5. [Vol. III, No. 4, Q. 1, p. 149.]

What is the difference between a state and a territory?

Ans. A territory is governed by a Governor and Secretary, appointed by the President, by and with the advice and consent of the Senate; by a Supreme Court, whose judges are appointed as above, and by a Legislature elected by the citizens of the Territory, which can make laws subject to the Governor's approval and under the supervision of Congress, which body can declare them null and void. The salary of the Governor, Secretary and Judges is paid out of the National Treasury, but the Legislature is compensated by the Territory. The Territory sends one delegate to Congress, who may speak on any question but has no vote. The Territory has no voice in the election of President or in any National matter. K.

6. [Vol. III, No. 4, Q. 2, p. 150.]

What meaning has the interrogation point enclosed in a parenthesis, thus (?) when used in an otherwise unbroken sentence?

Ans. This can be illustrated by an example better than it can be explained—*e. g.*, "The intelligent (?) committee removed the teacher." The (?) implies that the word *intelligent* is used ironically, meaning that the committee in question were anything but intelligent. *Id.*

7. [Vol. III, No. 4, Q. 6, p. 149.]

I have a three-cornered lot which contains an acre; each of the three sides is equal. What is the length of one side? If possible, by arithmetic.

Ans. This admits of two very nice solutions. First, by the rules of Arith. Art. 532 Milne or 397 Ray's Higher. The area of an equilateral whose sides are one yard each, is .0000894654+ of an acre. We may therefore form the proportion thus: $\sqrt{.0000894654+} : 1 :: 1 \text{ yd.} : (?)$, and solving this we get 105.723+ yd. for one side. Second: Since the area of an equilateral = the (base)² $\times \frac{1}{4}\sqrt{75}$, because by Art. 529 Milne, 420 White or 396 Ray, the altitude = the base $\times \sqrt{75}$; therefore, the (base)² = the area $\div \frac{1}{4}\sqrt{75}$ or the base = $\sqrt{\text{area} \div \frac{1}{4}\sqrt{75}}$. An acre = 160 sq. rds., therefore we have $\frac{\sqrt{160}}{\sqrt{\frac{1}{4}\sqrt{75}}} = 19.2224-1327+ \text{rds. or } 105.72327+ \text{yds.}$

MONT. T. VALE, *Lebanon, O.*

8. [Vol. III, No. 4, Q. 2, p. 149.]

A borrows a sum of money at 4% per annum, and pays the interest at the end of the year. He lends it out at the rate of 5% per annum, and receives the interest half-yearly. By this means he gains \$100 a year. How much does he borrow?

Ans. Assume \$1 as the amount. At the end of the year at 5%, will have drawn \$.050625 interest. Deducting \$.04, the am't of interest he pays, from \$.050625 we have a remainder of \$.010625, which is the gain on \$1. In order to gain \$100 he must borrow as many dollars as \$.010625 is contained times in \$100, which is 9411.76+ times. \therefore he borrows \$9411.76+.

JOHN SCHURR, *Muncie, Ind.*

NOTE.—If correspondents will observe the following rules their communications will be more likely to appear in print:

1. Write on one side of the paper only.
2. Write Questions and Answers on separate sheets and sign the name you wish to appear in print to each Question and Answer.
3. Be careful to make every letter, figure and sign plainly. Sometimes a good solution or question must be set aside because we cannot make out the name of the writer.
4. When sending solutions write the question out in full as well as the solution.

Hereafter we shall give credit to all solutions sent in and publish those so far as we have space, which seem to be the simplest, clearest and best. By some mistake we inserted an example over the name of D. C. Jones in June number, the same example having been correctly solved by him and also by J. C. Gregg, whose solution was published in Correspondence Department of same number.—[ED.]

GRAMMAR DEPARTMENT.

DIAGRAMS AND PARSINGS.

BY F. P. ADAMS.

¹That ²that ³that ⁴that lady ⁵parsed ⁶is ⁷not ⁸that ⁹that ¹⁰that she should have parsed.

Parse the numbered words and diagram sentence.

1. *That* is an adj., lim. *that* (2).
2. *That* is noun, com., 3d, sing., neut., nom., subj. of *is*.
3. *That* is a pron., rel., ant. *that* (2), with which it agrees in 3d, sing., neut.; obj., obj. of the verb *parsed*.
4. *That* is an adj., lim. *lady*.
5. *That* is an adj., lim. *that* (6).
6. *That* is a noun, nom., in the pred. with the verb *is*.
7. *That* is a pron., rel., obj., obj. of the verb *should have parsed*.

{	that	{	That
			lady | that
{	is that	{	parsed | <u>that</u>
			that
{	is that	{	she
			should have parsed | <u>that</u> .

O that this too too solid flesh would melt. Hamlet.

Diagram the sentence and parse *Hamlet*.

Hamlet is a noun, proper, 1st, sing., masc., nom., absol. by inscription. It is altogether unnecessary and improper to supply *by* and parse *Hamlet* as its object. This would require the filling out of the sentence thus:

[This was spoken by] *Hamlet*.

Hamlet is merely subscribed and is independent.

$\left\{ \begin{array}{l} (O) \\ [I] \\ [would] \end{array} \right.$	$\left\{ \begin{array}{l} (that) \\ \text{flesh} \end{array} \right.$	$\left\{ \begin{array}{l} \text{this} \\ \text{solid} \end{array} \right.$	$| \text{too} | \text{too}$	$\left\{ \begin{array}{l} \text{solid} | \text{too} | \text{too} \\ \text{would melt.} \end{array} \right.$

I know who told you to come.

Is *who* relative or interrogative?

A friend writes to know whether the word *person* is not understood before *who* as its antecedent.

Does the sentence mean "I know the person who told you to come?"

Suppose you say "I do *not* know who told you to come," and construe it mean, "I do *not* know the person who told you to come." Then suppose you on investigation find the person to be your *mother*. Does it not follow logically that you do not know your mother?

Then coming back to the question, is not the absurdity apparent if you supply the word *person*?

"I do not know who is in the garden" does not mean that I do not know the person who is in the garden. It may be my nearest friend and yet the statement be true that "I do not know who is in the garden."

Now, a relative pronoun is a pronoun which joins to its antecedent a limiting clause. If *who* in this sentence is a relative pronoun the word *person* or some antecedent must be supplied. But supplying an antecedent perverts the meaning of the sentence. Hence it is clear that it is not a relative.

The question arises what is it? One says an *interrogative*. The answer comes promptly that there is no question asked but that an affirmation is made.

Another answers a "responsive pronoun." That introduces a new class, which of course should not be done if it can be avoided.

Now to bring this to a close. It can not evidently be a personal pronoun; we have also shown that it can not be a relative. Let us examine again the view that it is an interrogative.

In the sentence he asked who you were, it is plain that *who* is an interrogative. The subordinate sentence which is interrogative is incorporated into the declarative sentence. Yet it still retains its interrogative nature and *who* is unquestionably an *interrogative*.

The sentence "he told me who you were" is similar to "he asked who you were." "He asked who you were" means he asked *the question* "who you were?"

"He told me who you were" means he told me *the answer to the question* "who you were?"

The subordinate sentence in both cases is interrogative, and of course the pronoun is interrogative.

I know "who struck you."

He asked "who struck you."

He told me "who struck you."

The subordinate sentence in each of these cases is the same nature and it seems to me apparent that in each case the pronoun is interrogative.

This point has been hotly contested by some grammarians. We believe that those who have done the most thinking on the subject are inclined to consider *who* an interrogative in such sentences.

EDITORIAL NOTES.

It is not to be mistaken that late years have seen wonderful changes in school administration. *Methods* are in vogue and *system* characterizes present school work. The careless, haphazard work of some years ago is not to be found in our better schools at this day. In such schools the time has gone by when pupils can cover half a wall in the solution of examples, and when through be able to tell nothing of the tangled maze but the answer. But solutions are now set forth in neat, business-like form, bringing to the *eye* the several steps, while the pupil with ease explains them. Method and order are thus instilled as *habit* and through such habit in every department, disorder will come to disturb his nerves as it should. To bring this about the teacher must require method in the preparation of manuscripts and all other exercises and see that the work is presented in that one way. Especially is this point important in the case of younger pupils. Not only *tell* them how you desire the work prepared, but put a model on the board. So much is lost by the teacher's not being specific and sure that he has made his directions plain to the very dullest one. Of course this doesn't apply to the teachers (?) who employ the dismal form of "Take the next lesson," or "Take the same lesson over to-morrow" in dismissing a class. *They* never think of directions, never *heard* of a "preliminary drill" on the next lesson as a closing exercise of every complete recitation. But to the others: Insist on your one form of preparation until it has been mastered by the class; *then* other forms may be considered if desired, or what is better still, at a second going over of the subject different forms of solution may be considered with profit, but at first when every thing is so new do not allow confusion to arise by allowing things to be so miscellaneous. So of Grammar: have your regular *form* for preparing the different kinds of lessons, which, give to the pupils before requiring the lesson. In Geography and History have your topic lists, &c. Have method in your work. It can not be dispensed with in a successful school.

SPEAKING of *system* and *method*, we are reminded of the abuse to which even these excellent servants may be subjected. It is through their use that routine and monotony, with their deadening spell, creep in unawares. Much is said of normal methods. They are but expedients which the real teacher employs to come near the mind and soul of pupils. If you, teacher, are but a mere imitator of methods you will fall short of this great end. It nearly all depends on the generous expansion, the vital glow of your own mind and soul. The principles which underlie methods must be fully realized to make them potent, to put into them the breath of life. A knowledge of the laws of human nature, in its mental unfoldings, its physical relations, the affections that reach out and must be reached after, and the soul with its great possibilities that sits dimly in its recess or glorifies with light—the whole being,

all these must be in a measure comprehended, the more fully certainly the better. Even benign Object Lessons and the spirit of the Kindergarten, originated to bless the lives of little ones, may be so systematized, elementarized and routinized as to be the very essence of tiresome foolishness unless in the hands of one taking in the scope and meaning of it all, capable of distinguishing between the means and the end.

WE have found it very helpful in managing a Geography class, in the way of arousing an interest in the country we may be studying, to read to the pupils or have them read a story, the scenes and events of which are laid in that country. Its rivers, mountains, &c., take on a new interest from their connection, they assume a reality, a fixed location and actuality in the minds of the children. Much History may be taught in connection with Geography in this way, they devour it with avidity and learn it to keep. There is none of the common branches which may be made so effectually a key to general information, or a nucleus rather, about which to accumulate knowledge as Geography. After inspiring investigation by every artifice, and *bringing out* in the class the information of the several members, it is an interesting exercise to *clinck* this knowledge by having them prepare compositions concerning the country just studied, the topic list they have used having given an orderly arrangement of the matter in their minds. There should be frequent written lessons in Geography. They constitute good language lessons and teach the spelling of Geographical names. In all your teaching, originate ways and means to keep alive thought and interest, at the hazard of every thing else. Order is a bad thing when gained at the expense or suspension of healthful mental activity.

IN the management of the recitation use just so much form and system as will expedite the business of the hour. The teacher being chairman of the meeting and the floor gained by addressing the chairman, he thus has it in his power to regulate the recitation. And without seeming to do so, as in the old-time arbitrary way, he sees that the rights and interests of all are maintained. This feeling of membership in a meeting for the good of all, over which the teacher is the courteous president, acting to see that justice is done to all, has a telling effect and works like a charm in the government of any school above the primary grades. From such a position or attitude toward the school, government becomes comparatively easy. The teacher will use every occasion to teach the courtesy due from one member to another and by example and precept inspire them with a regard for personal rights and duties. It is of but little import to expatiate on the grandeur of the golden rule or philosophize *abstractly* on personal rights, but seize on occasions as they rise, which they are certain to do, to bring the matter right home to the plaintiff and defendant and impress the listening jury. Make no rule until the necessity arises, then put it rather in the light of requesting a favor to yourself or explain it as a measure necessary to the common good and have it adopted and ratified by the school. There is then no trouble in carrying it out and the peace-breaker will be made to feel that he is offending the whole school instead of breaking *the teacher's rule*. Children are very reasonable creatures and may be easily led into right ways, but they hate driving and drivers, and as little do they respect that class, the incapables, and this is the secret of their dislike of school in many cases.

EXAMINATION DEPARTMENT.

QUESTIONS PREPARED BY THE INDIANA STATE BOARD
OF EDUCATION, FOR THE EXAMINATION OF
TEACHERS IN JUNE, 1880.

WRITING.

1. Write all the looped letters, and tell how many spaces in height and width each occupies. 10.
2. Name the four characteristics of good penmanship, and indicate which of the four you regard as most important. 10.
3. Begin with the letter H and write ten capitals in alphabetical order. 10.
4. How many and which letters are composed of the following lines, or repetitions of them, (/)? 10.
5. Describe how pupils should hold the pen. 10.

Let the penmanship of the candidate as shown in the answers to the above questions be marked from 1 to 50 according to the judgment of the Superintendent.

ORTHOGRAPHY.

1. (a) What is the distinction between *linguals* and *liquids*? (b) Give two linguals and two liquids. a=5; b=5.
2. (a) What sounds has the letter *a*? (b) Give words illustrating each sound. a=5; b=5.
3. Syllabicate and mark the accent of *illustrating* and *corporal*. 2 pts., 5 each.
4. Write phonically with the proper diacritical marks, *quotient* and *Hoosier*. 2 pts., 5 each.
5. Which rule of spelling is violated by spelling *traveler* with two *l's*? 5 for each.
6. Spell ten words pronounced by the Superintendent. 5 for each.

READING.

"Promote, as an object of primary importance, institutions for the general diffusion of knowledge. In proportion as the structure of a government gives force to public opinion, it should be enlightened."—*Washington*.

1. Who and what was the author of the above extract? Where and when did he live? In what was he especially remarkable? 5 pts., 2 each.
2. Define "promote," "institutions," "diffusion," "government," "public opinion." 5 pts., 2 each.
3. Select five words for a lesson in spelling and definition, giving reasons for your selection. 5 pts., 2 each.
4. What is meant by "as an object of primary importance," "institutions for the general diffusion of knowledge"? 2 pts., 5 each.
5. Express briefly in your own language, the sentiment of the above extract.

Let the candidate read a selection at sight, upon which he shall be marked according to the judgment of the Superintendent, from 1 to 50.

ARITHMETIC.

1. In digging a ditch 120 rd. long, and 3 ft. wide, 1,250 cu. yd. of earth were removed. How deep was the ditch? Proc. 5; ans. 5.
2. If a man can build $\frac{1}{3}$ of a wall in a day, what part of it can he build in $\frac{1}{4}$ of a day? By analysis. Anal. 5; ans. 5.
3. When 40 yd. of cloth cost \$82 $\frac{1}{2}$, what will $\frac{1}{2}$ of $\frac{3}{4}$ of a yard cost? Proc. 5; anal. 5.
4. I sold a watch and lost \$6, which was $7\frac{1}{2}\%$ of the cost. What was the cost? For what price did I sell it? What % was the selling price of the cost price? Proc. 4; each ans. 2.
5. My horse cost $\frac{2}{3}$ as much as my carriage, what % of the cost of one was the cost of the other? Proc. 4; each ans. 3.
6. At what rate of interest will \$100 double itself in 16 yr. 8 months?
7. If six men can build a wall 20 feet long, 6 feet high, and 4 feet thick in 16 days, in what time can 24 men build a wall 200 feet long, 8 feet high, and 6 feet thick? By proportion. Stat. 3; Proc. 3; ans. 4.
8. A man purchased a square farm containing 140 acres and 100 square rods. What was the length of one side of it? Proc. 5; ans. 5.
9. Reduce 3 bu. 2 pk. 3 qt. to pints. By analysis. Anal. 5; ans. 5.
10. The capacity of a cubical cistern is 74,088 cu. ft. What is the area of the bottom? Proc. 5; ans. 5.

GRAMMAR.

- (1) God bless the man who first invented sleep.
- (2) So Sancho Panza said and so say I:
- (3) And bless him, also, that he didn't keep
- (4) His great discovery to himself, nor try
- (5) To make it—as the lucky fellow might—
- (6) A close monopoly by patent right.

1. Parse the adverbs in the above. 10.
2. Parse the conjunctions in the above. 10.
3. Parse the adjectives in the above. 10.
4. Correct the following: indianapolis ind oct 20 1879 dear sir your last letter was duly rec'd no answer is required respectfully john smith. 10.
5. *Analyze*.—The life of Agricola, the Roman general who conquered Britain, was written by his son-in-law, Tacitus, the celebrated Latin historian. 10.
6. What are the uses of Etymology? 10.
7. Which of the pronouns indicate by their form the gender of their antecedent nouns? 10.
8. *Correct and Analyze*: He is to be married to I don't know who. First part 4; second 6.
9. Give two rules for the use of the semicolon. 2 pts., 5 each.
10. Define two kinds of verbs. 2 pts., 5 each.

GEOGRAPHY.

1. What is the shape of the earth? Give three proofs of this. 4 pts., 3 off for each error.

2. Name two chief natural divisions of land, and three of water. 5 pts., 2 each.
3. How does the eastern hemisphere compare with the western as to extent of surface? how, as to direction of greatest length? 2 pts., 5 each.
4. What general direction does migration take in the United States? Why? 2 pts., 5 each.
5. How are lakes divided? Name two of each class. 5 pts., 2 each.
6. What are the Trade Winds?
7. Define Capital, Capitol, Metropolis, Republic, Monarchy. 5 pts., 2 each.
8. Beginning at the north, name in order the Eastern States that border on the ocean and its arms. 5 pts., 2 each.
9. If you sail down the Elbe river from its source, what three important cities would you pass? 3 pts., 4 off for each error.
10. What range of mountains, between the Black and Caspian Seas, constitutes part of the boundary between Europe and Asia?

HISTORY.

1. What European nations established colonies in this country? 10.
2. How was Florida acquired by the United States? 10.
3. Tell the story of Valley Forge. 10.
4. What effects followed the completion of the New York and Erie Canal? 10.
5. Who was Thomas H. Benton? 10.
6. What causes produced the great European immigration to this country? 10.
7. What advantages have followed from the invention of labor-saving machinery? 10.
8. Name the five greatest prose writers and the five greatest poets in the United States within the past hundred years. 10 pts., 1 each.
9. When, where, and by whom was the first settlement made in Indiana? 3 pts., 4 off for each error.
10. From what books have you gained your knowledge of United States history? 10.

NOTE.—Narratives and descriptions are not to exceed six lines each.

PHYSIOLOGY.

1. Why are the bones of adults more easily broken than those of children? 10.
2. What is the function of ligaments? 10.
3. How many orifices has the stomach, and what is each called? 2 pts., 5 each.
4. What organ secretes the gastric juice? What separates the saliva? 2 pts., 5 each.
5. Why should food be properly masticated? 10.
6. What is the function of the lacteals? 10.

7. What is the distinction between arteries and veins? 10.
8. What are the objects of respiration? 2 pts., 5 each.
9. Name the layers of the skin, and give the function of each layer? 2 pts., 5 each.
10. How is proper bathing conducive to health? 10.

THEORY AND PRACTICE.

1. What is the value of mental analysis in teaching arithmetic? 20.
2. What is meant by teaching a definition, or a rule inductively? 20.
3. What should be the character of the first instruction in geography? 20.
4. Why should a teacher never inflict upon a pupil personal indignities as pulling the ears or hair? 20.
5. What should be the first aim of a teacher in managing a school? 20.

ANSWERS TO STATE BOARD QUESTIONS FOR JUNE, 1880.

IN SPECIAL CHARGE OF ANNIE M. SHERRILL.

The Number of the Answer Corresponds to the Number of the Question.

WRITING.

1. h, k, l, b, j, y, g, z, f. The letters *k* and *h* are three spaces in height and one in width; the letters *b* and *l* are three spaces in height and one-half space in width; the letters *j* and *z* are three spaces in length and one-half space in width; the letters *y* and *g* are three spaces in length and one space in width; the letter *f* is five spaces in length and one-half space in width.

2. Four characteristics of good penmanship and also important steps in teaching it are, *to know*, *to execute*, *to criticise*, and *to correct*.

The first; because without it the others are impossible.

5. The pen should be held between the thumb and first and second fingers, the holder crossing the first finger just forward of the knuckle joint. The end of the second finger should drop below the first, so that the pen may cross it at the root of the nail, and the end of the thumb should press upon the holder opposite the first joint of the first-finger. The first and second fingers should touch each other as far as the first joint of the first-finger; the third and fourth must be slightly curved and separate from the others at the middle joint, and rest upon the paper at the tips of the nails.
—*Spencer*.

ORTHOGRAPHY.

1. (a) Linguals are consonant sounds formed by the tongue. They are also called liquids because they unite easily with other consonant sounds. The only distinction being that there are two more of the liquids than of the linguals. (b) *l* and *r* are linguals and *l*, *m*, *n*, and *r* liquids.

2. A, *long* as in Fate.

A, short as in Fat.

A, long before r as in Fare.

A, Italian or grave as in Far.

A, intermediate as in Fast.

A, broad as in Fall.

A, slight or obscure as in Liar.

3. Il-lus'trat-ing; Cor'po-ral.

5. A final consonant, when it is not preceded by a single vowel, or when the accent is not on the last syllable, should remain single before an additional syllable.

READING.

1. The author of this extract is known as the "Father of his Country," the commander-in-chief of our armies in our infant struggle for existence as a nation, the first President of the U. S. He was born in 1732 and died in 1799. Lived at Mt. Vernon, Va. Washington was especially remarkable for his dignified manner, his firm trust in Providence, and as a military man in his cautious disposition and strategical powers.

2. "Promote," to contribute to the growth, enlargement or excellence; "institutions," here meaning schools or societies; "diffusion," extension, propagation; "government," the ruling power; "public opinion," the thoughts or opinions of the masses of the people.

3. Promote, primary, diffusion, structure, enlightened. It would be difficult to give a reason for the selection of these particular words. They seem to be words of importance and those which are less likely to be understood by the pupils.

4. Objects of primary or first importance should receive the greatest attention. The objects here mentioned as of first or chief importance are those institutions as schools and societies which are intended to increase general knowledge.

5. Educate the masses. In this lies the safety and permanence of our government.

ARITHMETIC.

1. 120 rd. = 1980 ft.

$1980 \times 3 = 5940$ = product of two factors.

1320 cu. yd. of earth = $1320 \times 27 = 35640$ cu. ft.

$35640 \div 5940 = 6$ = third factor, or depth of the ditch.

2. A man can do $\frac{1}{3}$ as much work in $\frac{1}{3}$ of a day as he can in a day.

If he can build $\frac{1}{3}$ of a wall in a day, in $\frac{1}{3}$ of a day he can build $\frac{1}{3}$ of $\frac{1}{3} = \frac{1}{9}$ of the wall and in $\frac{1}{3}$ of a day he can build 6 times $\frac{1}{9} = \frac{2}{3} = \frac{4}{6}$. Therefore he can build $\frac{4}{6}$ of the wall in $\frac{1}{3}$ of a day.

3. If 40 yd. cloth cost $\$82\frac{1}{2} = \$82\frac{1}{2}$, 1 yd. will cost $\frac{1}{40}$ of $\$82\frac{1}{2} = \$2\frac{1}{8} = \$2\frac{1}{8}$. $\frac{1}{2}$ yd. will cost $\frac{1}{2}$ of $\$2\frac{1}{8} = \$1\frac{1}{8} = \$1\frac{1}{8}$, and $\frac{1}{4}$ will cost $7 \times \$\frac{1}{8} = \$\frac{7}{8} = \$\frac{7}{8}$.

$\frac{1}{2}$ of $\frac{1}{4}$ will cost $\frac{1}{2}$ of $\$1\frac{1}{8} = \$\frac{1}{4} = \$\frac{1}{4}$.

4. Let $100\% = B = \text{cost}$.

Then if $\$6 = 7\frac{1}{2}\%$ of cost, $1\% = \frac{1}{7\frac{1}{2}}$ of $\$6 = \$1\frac{1}{3}$.

And $100\% = 100 \times \$1\frac{1}{3} = \$133\frac{1}{3} = \$80$.

Therefore the watch cost $\$80$.

$\$80 - \$6 = \$74 = \text{selling price}$. $\$74$ is as many % of $\$80$ as 1% of $\$80$ is contained times in $\$74$.

1% of $\$80 = .80$ $\$74 \div .80 = 92\frac{1}{2}\%$.

Therefore selling price is $92\frac{1}{2}\%$ of cost price.

5. Let $100\% = B = \text{cost of carriage} = \frac{2}{3}$. $\frac{2}{3}$ is as many % of B as 1% of B is contained times in $\frac{2}{3}$. $\frac{2}{3} \div .01 = 60$.

Therefore $\frac{2}{3} = 60\%$ of the cost of the carriage = cost of horse. $\frac{2}{3}$ is as many per cent. of $\frac{2}{3}$ as 1 per cent. of $\frac{2}{3}$ is contained times in $\frac{2}{3}$. 1 per cent. of $\frac{2}{3} = \frac{1}{150}$. $\frac{2}{3} \div \frac{1}{150} = 100 = 166\frac{2}{3}$.

Therefore $\frac{2}{3} = 166\frac{2}{3}\%$ per cent. of the cost of the horse = cost of carriage.

6. Int. of $\$100$ at 1 per cent. for 16 yrs., 8 mo. = $\$16.66\frac{2}{3}$. $\$100$, (given int.) $\div 16.66\frac{2}{3} = 6 = \text{rate \%}$.

7. Take 16 da. for 3d. term because time is required in the answer. If 6 men require 16 days to build the wall, 24 men will require less time; therefore divide by 24 and multiply by 6.

If a wall 20 ft. long req. 16 da., 200 will require more time, therefore multiply by 200 and divide by 20. If 6 ft. high require 16 da., 8 ft. high will require more time, therefore multiply by 8 and divide by 6. If 4 ft. thick require 16 days, 6 ft. thick will require more time, therefore multiply by 6 and divide by 4.

Statement: $20 : 200 :: 16 : (?)$

$6 : 8$

$4 : 6$

$24 : 6$

Solution: $\frac{16 \text{ da. } 6. 200. 8. 6}{24. 20. 6. 4} = 80 \text{ da.}$

8. $140 \text{ A.} = 22400 \text{ sq. rd.}$ $22400 \text{ sq. rd.} \div 100 \text{ sq. rd.} = 22500 \text{ sq. rd.}$

$\sqrt{22500} = 150 \text{ rd.} = \text{one side of field.}$

9. In one bu. there are 4 pk.

$3 \text{ bu.} = 3 \times 4 \text{ pk.} = 12 \text{ pk.}$

$12 \text{ pk.} + 2 \text{ pk.} = 14 \text{ pk.}$

In one pk. there are 8 qt.

$14 \text{ pk.} = 14 \times 8 \text{ qt.} = 112 \text{ qt.}$

$112 \text{ qt.} + 3 \text{ qt.} = 115 \text{ qt.}$

In 1 qt. there are 2 pt.

$115 \text{ qt.} = 115 \times 2 \text{ pt.} = 230 \text{ pt.}$

Therefore in 3 bu. 2. pk. 3 qt. there are 230 pt.

10. $\sqrt[3]{74088} \text{ cu. ft.} = 42 \text{ ft.} = 1$ of the dimensions of the cistern. $(42 \text{ ft.})^2 = 1764 \text{ sq. ft.} = \text{area of the bottom, or any side of the cubical cistern.}$

GRAMMAR.

1. *So* limiting said, and *so* limiting say, NOT in the third line (did not keep) limits keep. *Also* limiting *bless*, in the third line. *First* limits *invented*.

2. *And* in the second line connects the two clauses of that line. *And* in the third line connects *bless him, &c.*, with the clause preceding; *that* connects *bless him*, with *he did not keep his great discovery to himself*. *Nor* is a *disjunctive* conjunction connecting the clause preceding with, *try to make it a close monopoly by patent right*.

3. *Great*, an adj. descriptive, limits *discovery*.

Lucky, adj., des., limits fellow. *Close* adj., des., limits monopoly, *patent*, limits right.

4.

Indianapolis, Ind., Oct. 20, 1879.

DEAR SIR:

Your last letter was duly received. No answer is required.

Respectfully,

JOHN SMITH.

5.

{	life {	The of Agricola |	general {	{	the Roman who conquered | Britain, his. Tacitus, | historian {	{	the celebrated Latin.

6. The uses of Etymology are to set forth the classification of words as to their signification and use, and the inflection of words or the changes of form which they undergo. It also shows the derivation of words by tracing them back to their original form and meaning.

7. Personal Pronouns.

8. I do not know to whom he is to be married.

The above is a complex declarative sentence, of which *I* is the simple subject unmodified, *do not know to whom he is to be married*, is the complex predicate of which *do know* is the simple pred., modified by *not*, a simple adverbial element of the first class, and *to whom he is to be married*, a simple adverbial element of the third class and also a simple declarative subordinate sentence of which *He* is the simple sub. modified, by *to be married*, an infinitive in the pred., having cons. of an adjective, and *is to be married to whom* is the complex pred., of which *is to be married* is the simple pred. modified by *to whom*, a simple adverbial element of the second class.

{	I do know {	{	not he is to be married |	to whom.

9. Before *as*, *namely*, *to-wit*, and other words when they introduce examples, specifications or enumerations, a semicolon should be used.—*Holbrook*.

When several clauses or grammatical expressions of similar construction follow each other in a series, all having a common dependence upon some

other clause, they are separated from each other by a semicolon, and from the clause on which they all depend, by a comma. Ex.: Philosophers assert, that nature is unlimited in her operations; that she has inexhaustible treasures in reserve; that knowledge will always be progressive; &c.—*Hart.*

10. A *defective* verb is one which is wanting in some of the modes and tenses. A *redundant* verb is one which has more than one form in the past tense or past participle.

GEOGRAPHY.

1. The earth is in the form of an oblate spheroid. Its rotundity may be shown in many ways, three of which we give: 1. Navigators have sailed continuously in one direction as near as the configuration of the land would permit and reached the same point from which they started. 2. We can only see the top part of a ship at a distance on the sea, the curve of the earth's surface hiding the hull or lower part. 3. The shadow of the earth as seen in an eclipse of the moon is always circular. None but a spherical body will cast a circular shadow in every position.

2. Island, peninsula; ocean, lake, gulf.

3. The eastern hemisphere has the greatest area. The direction of greatest length in the western hemisphere is from north to south, in the eastern from east to west.

4. The general direction of migration is toward the west for the reason that the agricultural and mineral resources invite unemployed capital and labor.

5. Lakes may be divided into four classes, viz: (1) Those having outlets and no inlets. (3) Those having both inlets and outlets, and (4) those having neither inlets nor outlets. They may also be divided into fresh water lakes and salt water lakes. Of the former may be mentioned Lakes Erie and Ontario, of the latter Great Salt Lake and Caspian Sea.

6. The constant, northeasterly and southeasterly winds occupying a zone of 25° or 30° on each side of the equator are called Trade Winds.

7. Capital refers to the name of the town or city in which the Legislature convenes or which is the seat of government. Capitol is the name applied to the building where legislation is enacted. Metropolis is the chief city in importance of a state or country. A Republic is a government in which the sovereign power is vested in representatives elected by the people. A Monarchy is a government in which the sovereign power is lodged in a single chief ruler.

8. Me., N. H., Mass., R. I., Conn.

9. Dresden, Magdeburg and Hamburg.

10. Caucasus Mts.

HISTORY.

1. French, English, Spanish, Dutch and Swedish.

2. By purchase from Spain in 1820.

3. Washington went into winter-quarters at Valley Forge on the 11th of Dec. 1877. His army were in a very destitute condition. The winter was unusually severe. To add to the distress Congress in a measure abandoned Washington and many of his firmest friends among the military leaders turned against him. This period is known as the "darkest hour of the Revolution." But the nation did not lose confidence in Washington and the mass of his army were faithful in their allegiance.

4. This magnificent public improvement owed its success to the genius of De Witt Clinton, and contributed in a very great degree to make New York City what it is at present—the great emporium of the country.—*Anderson's School Hist. U. S.*

5. Thomas Hart Benton, b. 1782, in North Carolina, settled in St. Louis in 1815, was a noted supporter of Andrew Jackson and an advocate of gold and silver currency. He held a seat in Congress for 30 years. He was noted as one of America's greatest Statesmen and was the author of a "A Thirty Year's View, or a History of the Working of the American Government for Thirty Years from 1820 to 1850." He died in 1858.

6. Among the causes of the great European immigration to this country may be mentioned, the oppression and overcrowded condition of the nations of Europe together with the fact of our possessing a free government and immense natural resources.

7. The invention of labor saving machinery has been one of the leading factors in our rapid increase in wealth, population and general prosperity. It has multiplied the luxuries of life, and afforded men time for the cultivation of the intellect.

8. Nathaniel Hawthorne, Washington Irving, George Bancroft, E. P. Whipple, Ralph Waldo Emerson, noted prose writers. James Russell Lowell, Henry W. Longfellow, John G. Whittier, Oliver Wendell Holmes, Fitz Greene Halleck, poets.

9. Indiana was first settled at Vincennes by the French in 1730.

PHYSIOLOGY

1. The bones of adults contain a greater proportion of earthy matter and consequently are more brittle.

2. To hold the joints in position.

3. The pyloric and cardiac orifices.

4. The mucous membrane of the stomach secretes the gastric juice and the salivary glands separate the saliva from the blood.

5. Food should be well masticated that it may be finely divided in order that the gastric juice can have free access to all the particles, also mastication causes a thorough mixture of the saliva which is necessary to digestion.

6. The lacteals are those absorbent vessels of the intestines which take up the chyle and convey it to the thoracic duct which empty it into the general circulation.

7. Arteries carry blood *from* the heart, veins carry blood *to* the heart.

Arteries with the exception of the pulmonary carry arterial or pure blood. Veins with the exception of the pulmonary carry venous or impure blood. Veins are supplied with valves, arteries are not. The blood flows in the veins in a steady stream, in the arteries it flows in wave like impulses.

8. The objects of respiration are to supply the blood with pure oxygen and set free carbonic anhydride and other impurities.

9. The outer layer or epidermis, and the inner or cutis vera. The function of the first is that of protection to the organs which lay beneath it. The cutis is a receptacle for nerves of sensation, sebaceous and perspiratory glands.

10. Proper bathing is conducive to health because it opens the pores and allows free action of the skin in throwing off impurities from the blood.

THEORY AND PRACTICE.

1. Mental analysis is of practical value because in the business affairs of life it is frequently necessary to carry on mental operations with numbers. It is of value also as a discipline to the mind, strengthening the reasoning powers.

2. In teaching definitions indirectly we cite the pupil to examples analyzing and classifying them and from these derive the definition by inference or induction. The word induction in the sense here used means the process of reasoning from a part to the whole or from particulars to generals. The word means literally to lead in. We thus lead the pupil into a definition or generalization by having him first consider the particulars and by comparing and studying them in their relations to each other he is led to define and lay down a general law or definition. Induction is the opposite of deduction. By the latter we begin with a general truth and seek to connect it with the particular case before us. To illustrate: Franklin by a process of inductive reasoning established the identity of lightning and electricity, and by deduction he inferred that metallic rods might be a protection to buildings. Brook's Arithmetic, p. 91, says "by the Inductive method we solve all the different cases by analysis, and derive the *methods of operation or rules* from these analyses by *inference or induction*. By the Deductive method we first establish a few general principles and then derive all methods of operation or rules from these general principles."

3. The idea of direction should first be taught, then the manner in which portions of the earth's surface are represented by means of maps. A map of the school-room should be drawn, locating the desks, stove and other objects. From this proceed to a map of the school-yard or adjoining farms. The form of the earth may next be taught and the general divisions of the land and water, using a globe and outline maps with frequent class drills.

4. Because such insults provoke a spirit of resentment on the part of the pupil and are calculated to make him hate and despise the teacher. A teacher who resorts to such means of punishment should have no place in the school-room.

5. The teacher should first aim to keep all pupils pleasantly and profitably employed. If he succeeds in this little more will need to be done to do to secure good order in the school.

COLLEGE DEPARTMENT.

DEVOTED TO THE INTERESTS OF THE CENTRAL NORMAL,
DANVILLE, INDIANA.CONDUCTED BY G. DALLAS LIND.

DEAR FRIENDS:—We promised last month to tell you what we saw at the Exposition, but really to begin to tell *all* we saw would occupy our entire space and we are puzzled to know what to say and what to leave out. Many students had gone home before the Exposition day and some who had gone during the term and at the close of previous terms had taken apparatus and other work which they had prepared while here, along with them, consequently the Exposition did not fully represent the work of the year. But if you had been here you would have been astonished at the work which was exhibited. The attendance was large and everybody expressed admiration at the display of work. We will just fall into the throng and make a few notes as we go along. First we enter the Physical Laboratory in charge of Dr. Joseph Tingley. Here we see a steam engine running turning lathes, a circular saw, an emery wheel, a grindstone, &c., with which are turned out the parts of electrical machines, air pumps, compound and solar microscopes, polariscopes, magnets, mathematical and metrical blocks, &c. The electrical machine manufactured for the use of the school is the largest in the State. Next we go to room E where we find exhibitions of the work done in the Commercial Department, the books of the book-keeping class, statements and examples on blackboard, specimens of penmanship, &c. Also in this room we find the Lord's Prayer and other passages written in German, Latin and Greek, the work of pupils pursuing the study of these languages. Passing to room F, we find a variety of work. On the blackboards are solutions of arithmetical and algebraic problems, geometrical figures, diagrams, &c. On tables we find piles of outlines in History, Geography, Rhetoric, and other branches, also plats of streets, lots and elevations in and around Danville, the work of the Surveying and Engineering classes. We have also an exhibition of some of the work of pupils in the line of philosophical apparatus, such as we mentioned in describing the Laboratory. There were several electrical machines made by pupils with the help of the machinery mentioned, a large number of magnets which were exhibiting their attractive powers by holding iron filings, nails, tacks, &c., compound microscopes adjusted with objects for the observation of visitors and—well, our space is limited. We must now pass to room H where we find a magnificent display of Geological specimens most of which were collected in the neighborhood of Danville, representing over one hundred varieties of minerals and fossils. Also many fine marine shells, corals and foreign minerals which had been procured by exchanges or purchased by members of the school.

Next we have a display of pressed flowers and leaves neatly labelled and classified, showing the work of the Botany classes and Botany sections. But when we come to a real show, a fine art exhibition, the work of the pupils of Miss Mary J. Willis in drawing and painting. We will not attempt to describe this work. Suffice it to say that they attracted universal attention from all visitors and that Miss Willis deserves great credit for her untiring efforts in making this department a grand success. Besides the vast numbers of outlines in Botany, Geology, Zoology, &c., a number of charts of Chemistry and Literature formed a part of the display in this room. These charts were marvelous examples of patient study and research as well as of neat mechanical execution. The maps of the Geography classes were surprisingly fine and reflect much credit on the work in this line.

We will only draw the moral to this and close. Go thou and do likewise, teacher. You can get up an Exposition in your own schools for the last day of the term. It will be perhaps on a smaller scale than this, yet will astonish the "natives" when they see it. Read the editorial on this subject in the April number of *THE NORMAL TEACHER*.

Miss Effie Thomas, Eureka, Ind., writes after returning home, "I was glad to learn that the school which I have taught for the past two winters, had been given me during my absence. I am determined to do better work this winter in the school-room than ever before. I shall always speak a good word for the Normal and ever remember the kindness of my teachers."

D. S. Dent writes from "away out in Idaho" (Lewiston) and says that he thinks he will be back again in school. Thinks it will pay him to go so far as his expenses would be so much less than any school nearer home.

Miss Dora Lieuellen is now attending the Boston School of Oratory, Martha's Vineyard. She will be with us again the beginning of next year. She has done a grand work in the Normal, a fact to which every pupil who has ever been in her classes will testify. She will come back to us refreshed and devote her entire energies to the work in Literature, History, &c., in which she has proven herself so eminently successful.

Prof. U. J. Hoffman who had just closed a successful Summer Normal at Cloverdale, Ind., has been teaching History and Geography in the Normal during the short term.

Miss Mary C. Bowen will teach in the Grammar Department of the public schools of Danville next year. Her work in the Intermediate Department last year was highly appreciated.

J. Q. Allen who has been our accommodating Librarian this year will attend Medical lectures at Indianapolis beginning in October.

Your humble servant who writes this will spend his vacation in Iowa and Ohio, capturing "bugs" and picking up rocks and will be happy to see any Normalite who has specimens to sell, give away or exchange. He intends to work for the improvement of the Cabinet and any assistance rendered by Normalites will be appreciated.

PUBLISHER'S DEPARTMENT.

KEEP a watch for the blue X. _____

How do you like our new dress? _____

You will find it profitable to take an agency for this journal at your Institute. _____

Now is the time to form clubs for THE NORMAL TEACHER. We hope that all of our agents will push the work with vigor. _____

YOU can not afford to miss a number of THE NORMAL TEACHER. Renew promptly. Remember we can not furnish back numbers. _____

THE Short Term of the Central Normal College is one of profit and interest to all in attendance. We extend an invitation to everybody to come to Commencement. _____

THE *Ohio Home and Trade Journal*, a new monthly paper is one of our most valued exchanges. We hope many of our readers will find it convenient to subscribe for it. It is published at Columbus, Ohio. _____

WE call the attention of our readers to the advertisements of Dr. Tingley's Mathematical and Metrical Blocks and Black-board Preparation. We believe that these goods are unsurpassed. Every thing is just as represented in the Advertisements. All persons interested in goods of this kind should give Dr. Tingley their orders. _____

OUR agents will do well to impress the fact at every Institute that THE NORMAL TEACHER has the largest circulation of any school journal in the United States. That such a circulation should be reached in two years and six months is sufficient proof that THE NORMAL TEACHER more nearly meets the demands of the times than any other school periodical. _____

OUR books are selling very rapidly. We are giving better commission on them this summer than we gave last, notwithstanding everything in their manufacture is much higher. The books are eminently practical—all having been prepared by experienced Normal teachers, are models of beauty in mechanical execution and sell readily to teachers of all ranks. These books have been adopted as text-books by many Normal schools, High schools and Institutes. Thousands of these books will be sold at the Institutes this summer and right lucky will be the agent who secures one or more counties as his territory. We shall be glad to hear from any of our readers who desire to sell any of these books or take subscriptions for THE

NORMAL TEACHER. Send for our terms to agents. If you can't undertake the sale of our books you can at least make a club for this journal. Let us hear from all who will try. Sample copies and circulars will be sent *free* to any person who will signify a willingness to try for a club.

COUNTING, as is customary, that every paper is read by at least five persons, this number of **THE NORMAL TEACHER** will be read by at least 80,000 teachers. We hope that every one of this vast throng will catch new inspiration from a perusal of these pages and that a large number of them will feel that they can not spend seventy-five cents to a better advantage than in subscribing for **THE NORMAL TEACHER**.

To our agents in the field we say, *push your work*. Your success in selling books and taking subscriptions like any other business depends on your energy and push. Work with a will, not only for the remuneration it may bring you in dollars and cents, but for the good that will result to the teachers, and through them to the thousands of children throughout the country, from a wide, broad and universal knowledge and practice of Normal principles and methods of training.—To one and all in this great work we bid Godspeed, and may we hear glorious reports from you soon.

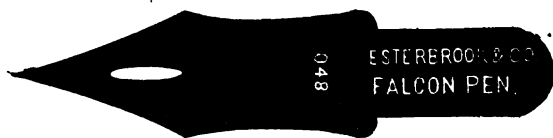
THERE are a few school journals and one in particular whose editorial columns are filled (not with ideas and thoughts on education, O no), but with promises of great articles from great men which are to appear in future numbers. The statements are so made as to lead those who are not posted to believe that these articles have been prepared *expressly for these papers* when such is not the case. The articles have been previously written for other journals and are let out to these third-rate school journals at second and third hand and published as having been prepared alone for their columns. Of course the articles are not damaged in the least by being passed around, but that any school journal should try to make its readers or the public believe that such articles were prepared alone for their columns and published for the first and only time by them is an imposition. There is another class of school journals whose columns are made up with copied articles from other papers. If perchance any thing does appear as original it has been copied and no credit given. Scores of our editorials and communications have appeared in other school journals as original matter. We wish the school journals of the country would quit practicing imposition; that the editors would edit their journals with their own brains and not with paste-pot and scissors. Then would teachers take more school magazines and the different school magazine editors and publishers would have less to say about not being patronized.

WE invite the attention of our readers this month to our new title page, the design and cut of which was gotten up at considerable cost. We believe in improvement and are determined that **THE NORMAL TEACHER** shall not

only be foremost in the ranks of school journals in the amount of and value of the subject matter but also in mechanical execution and general appearance. We are determined to be successful by meriting success. We have no State with its Institutions and officers back of us to do our bidding and press our claims whether we merit patronage or not. We send out our journal upon its own merits as a practical, live, wide-awake school journal. We are thankful for the help given it by its friends and all who work for its success shall be remunerated. We are constantly improving it. We have more and better things to say the coming year than we had in the year gone by. Our experience in the past will enable us to publish a better journal than heretofore, the educational world is improving and why shouldn't we make **THE NORMAL TEACHER** better this year than even before in its history? We intend that **THE NORMAL TEACHER** shall maintain its reputation for practicability, and that its prosperity shall be greater than ever the coming year. We are heartily sick and tired of the old *stereotyped* and *fossilized* school journals with which the school teachers of this country are blessed. No wonder there are so many school teachers who take no school journal. All that they can get out of the most of them that is worth reading is some news items that they have read in some daily paper, three or four weeks before it comes out in the school journal. There are some exceptions, we know. Some of our school journals are good literary magazines, but then this is not what the teacher wants when he subscribes for a school journal. He wants a *school journal*. One that will give him methods of teaching; one that will instruct him in the science of the mind—acquaint him with the material upon which he works; one that will give him a clearer insight into the branches he teaches; one that will give him practical instruction in school government—not mere theories that are worthless, but something that he can use; one that will assist him to better qualify himself for his work in every way. This is the kind of a magazine that we are trying to edit and publish. We are offering it at a price that is within the reach of every one who aspires to be a teacher. We give premiums for clubs that are simply astonishing. Write us for an agency.

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THE NORMAL TEACHER.

VOL. III. DANVILLE, IND., SEPTEMBER, 1880. No. 7.

ELECTRIC EXPERIMENTS.

J. E. BAKER.

DYNAMICAL OR CHEMICAL ELECTRICITY.

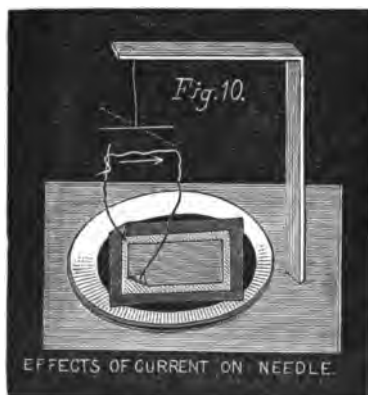
In consequence of the fact that this season of the year is unfavorable to the manipulation of frictional electricity the subject has been dropped for the present, and chemical electricity taken up instead. Experiments illustrating the principles of the former have been given in their proper order, but the fifteen or twenty experiments exhibiting the various phenomena of the latter will be presented in as nearly logical order as convenient.

Static or frictional electricity is that form of electric force capable of being retained for a time on an excited or charged body. Dynamic or chemical electricity is that form which manifests itself by a continuous *current*. Indeed it is sometimes termed *current* electricity. It is also called Galvanic and Voltaic electricity in honor of the two celebrated Italian thinkers, Galvani and Volta, who were among the first to notice (1780-1799) this new manifestation of electric action. The term *chemical*, though the most convenient and generally used, is not strictly applicable since there are currents produced (by heat and motion of magnets) besides chemical action.



Simple Battery—Zinc and Tin-Foil.—The following simple arrangement is one of the clearest illustrations of the production of an electric current by chemical action:

Take a large piece of tin-foil (that used around grocery articles), fold it and place in a large shallow dish. Place upon the foil a piece of heavy blotting paper or cloth about the same size. Place upon this a piece of sheet zinc (to be obtained at any tin-shop; the zinc under stoves or on wash-boards, answers the purpose) a little smaller so that the foil and zinc are not in metal connection. Attach to the foil and zinc small copper wires. Fill the dish with a solution of sulphate of copper or blue vitriol (pulverize some blue vitriol and put in rain water letting stand till dissolved) and the battery is complete as shown in Fig. 9. Bring the ends of the wires together and a current of electricity acts through them, which can be made manifest in several ways; *first*, by bringing the closed wires through which the current is acting, immediately under a suspended



magnetized needle, Fig. 10. If the needle be quiet and the wire parallel to it, it will at once be deflected or turned aside

slightly. The needle may be made by rubbing a darning-needle or piece of knitting needle across one end of a magnet and suspended by an untwisted thread by a wooden support, remote from any iron or steel articles so that when it comes to vibrate it will point north and south. The needle may be more easily suspended by running it through a small three-cornered piece of writing paper and attaching the thread to this. *Second*, make the free ends of the wires clean with a knife or file (the wires at all attachments should be made clean and firmly fastened), then bring them very near to each other, a small, bright spark is seen. *Third*, place the tongue between the free ends of the wires and a thrilling sensation will be felt. *Fourth*, it will nicely work on electro-magnet, to be described in next article.

Water with a little sulphuric acid added can be used instead of the solution of blue vitriol.



Sulphate of Copper Battery—Zinc and Copper.—Take a tin fruit can holding about a quart and cut off the top. Place in the bottom of this a piece of blotting-paper. Take a piece of sheet zinc as wide as the cup is high, and bend it in the form of a cylinder so that it will rest freely in the cup. Get from a tinner a piece of sheet copper about the same size of the zinc, bending it also in the form

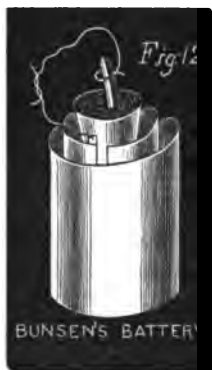
of a cylinder, a little smaller, however, than the zinc, so that it will stand freely within the zinc cylinder *without touching*. Attach wires to the zinc and copper, and fill the cup with a solution of blue vitriol. The battery is now ready for use, Fig. 11. Close the wires and test the existence of the current as in last experiment.

It is said that there are two currents produced by this chemical action—positive and negative. Only the positive current is taken into consideration. The metal most easily acted upon by the liquid is called the positive or generating

plate, the other metal the conducting or negative plate. The direction of the current in the liquid is from the zinc or positive plate to the copper or negative plate. In the wire it is from the negative to the positive. The free ends of the wires are called the poles; the one attached to the zinc is termed the negative pole, and that to the copper the positive, just opposite to the names of the plates.

It is this kind of battery, made by the combination of zinc, copper and blue vitriol, that is in general use at present on most telegraph lines.

Water and sulphuric acid may also be used instead of the solution of blue vitriol as in the preceding experiment.



Bunsen's Battery—Zinc and Coke.—

Prepare a tin cup as in the last experiment. Put into it a porous cup of unglazed earthenware (a flower pot) sufficiently smaller than the tin cup so that a piece of sheet zinc bent in the form of a cylinder will rest freely between the two cups. Fill the porous cup with pulverized coke, by putting in a small quantity, then a little nitric acid to make it moist and repeat until the cup is full. Now thrust in the moist powder a slender piece of coke to which a wire is to be attached. Also, attach a wire to the zinc and fill the tin cup with water adding a little sulphuric acid, and the battery is complete, Fig. 12. Close the wires and test the action of the battery and the existence of the current as in the preceding experiments. A very intense current is produced by this arrangement and is considered one of the very best kind of batteries.

Bunsen's battery as described in books consists of a plate of carbon in the porous cup instead of the coke; the latter is given, however, because it is the most easily obtained.

Either of these batteries, singly or several, joined together costing only a few cents, will be all that is necessary to demonstrate most of the phenomena of chemical electricity. Many practical and interesting facts can be illustrated by the aid of these batteries, such as plating and separating water into its constituent elements, which will be shown in future articles.

TALKS ON ELOCUTION.—NO. VI.

G. WALTER DALE.

Sometimes I enjoy my work before teachers and sometimes I feel that it is "Love's labor lost." I always feel cheerful and in good spirits when I come before you in these "talks." You may easily guess why. I know you all read some educational publication of current literature, and teachers don't do that before whom I dislike to work. You may make such deductions as suggest themselves and allow me to go at once into my theme.

How to say things in conversation. Here we have the actual Elocution of conversation. We find in skill in this art the highest marks of good breeding, good taste, and discreet judgment. We also find the illustration of patient practice and careful training, as to voice and manner. We may feel very polite in our relation to others and we can prove it when we speak if we know how to say things. I almost despair of saying all I desire in the scope of a single "talk" for the subject comes up before me in all its magnificence, and such a mass of requirements presents itself that I hardly know where to begin to assort its elements. First of all, however, have you an agreeable voice? If not set about making it so at once. If you only say "good morning; how do you do?" say it in a voice that will indicate the feeling expressed. Don't use harsh guttural sounds in conversation. The purest of pure qualities figures in social converse. If your voice is high pitched or too loud remedy these defects by practicing faithfully toward the other extreme. Your development is highest when you encompass both extremes and have the good sense and self control to use the mean.

If you knew how to say things you would rarely scold for by scolding you gradually grow into a growling way of conversing. Practice of any thing makes it a habit, by and

by, and you should be careful not to acquire habits that would be distasteful. When any thing of this nature becomes a habit in us we are not likely at all to notice it for we make no unusual volitional effort to do it; others notice it in us however and if they be true friends, and we be true to ourselves, amends can readily be made by criticism. Very few of us have the boon of candid friends, and hence, must depend largely upon ourselves, and must exercise constant and careful vigilance. If you have a competent friend who is honest enough to tell you of your faults, instead of being provoked, thank him kindly even if his criticism has mortified you inexpressibly. Here is what will require grace to do but you should consider yourself happy in the acquaintance of such a friend and as Hamlet says "grapple him to your soul with hooks of steel."

In cultivating yourself for saying things in the most pleasing and effective manner do not forget that much of your success depends upon the grace and propriety of your movements. To say a thing beautifully and act awkwardly in doing it presents an incongruous mixture of beauty and absurdity which spoils the effect of the whole thing. Our action taken as part of our expression in elocution is a very important consideration. Study different tones of the voice. Tones reflect sentiments or emotions and indicate the state of the feeling. Suppose you were made quite angry just now, and in ten minutes, or five minutes, perhaps, you should be ushered into a room full of ladies and gentlemen who knew nothing of your causes of anger, if you should speak in a tone to betray your feeling you should not do right. You must suppress the feeling before the innocent and use tones that reflect the most affable state of mind. This may be objected to as savoring of deception. It is not. A thing is not to be called deception unless there be a selfish motive in it and in this case we consult the happiness of others first and our own tendencies and inclinations last. If you have an unpleasant or a bitter thing to say, soften it as much as you can in

the way you say it. This is the secret of criticism, which can never be productive of good results if we outrage the feelings in making it. A teacher needs this skill for his whole business is one of criticism and his success will be largely measured by his ability to make valuable, close criticisms, and spare the feelings and self respect of pupils. It is impossible, within the scope allowed in these "talks" to be exhaustive in our treatment of the topics, but it is my hope that in this brief manner of presentation I may be able to awaken thought and investigation upon subjects not touched in the technicalities of normal education. I shall try to confine myself to the most practical phases of the subjects before us at any time and hope to have the willing support of the teachers in my vast auditory, if I may denominate it so, in an earnest effort to improve upon their present state of advancement. I feel, in this relation to you, just as much a teacher as if you had specific work assigned and were expecting to recite to me. THE NORMAL TEACHER is merely my class room and you, teachers, scattered to the four winds of heaven, are my pupils.

Remember that in all the realm of elocutionary work there is no more important consideration than the one we have been engaged upon for the past three months, as it is at the foundation of all true, artistic excellence. It is much more difficult to read a conversational selection well than one of a more demonstrative character. As pieces for practice in this department let me suggest "Hamlet's advice to the player;" "Scrooge and Marley;"—the opening of the Christmas carol, by Dickens; and in poetry, Alice Cary's "Order for a Picture;" and "Forty years ago;"—in some books known as "Twenty years ago." Read these as you should say the same thoughts actuated by like motives to those you may conceive to have called forth such language. I have already over-run my time and thus excuse my abrupt close. Let me add the suggestion that each one devote a little—a specified time, to this study daily. You will be surprised at the results.

MORE SYSTEM NEEDED.

GEORGE HARPER.

Foreigners readily admit that our American school books are superior to any in the world, and it is a well known fact that the imprints of our leading educational publishers are found, as approved text-books, in the great empires of China, Japan, and in various other parts of the world. They likewise freely acknowledge that the public schools in our great cities are not to be surpassed in all that constitutes superior excellence, whether in methods, government or discipline.

But when they come to the subject of our country schools they usually find here very little to excite admiration or praise. In fact, it is painfully evident to these foreign critics that we are weakest where we ought to be strongest; and so they usually say little about it, while they think the more.

The reason of this backwardness undoubtedly is that many of these schools are yet but in their infancy, especially in the newer states and territories. They are an outgrowth of the youthful but vigorous nation that is advancing with such gigantic strides in all directions to occupy and possess this great continent, and considering everything, if not as perfect in some respects as they might be, they are at least creditable to a people who have new regions to conquer and so many varied interests to attend to. That the system under which they exist is capable of improvement no one will dispute; and before the public schools become altogether worthy of the great and mighty nation whose peculiar pride and glory they are destined one day to become, this system must receive greater attention from educators than it has yet done. To keep the schools abreast with the times, however, an improvement upon the system seems to be demanded; and it must be made at no distant date, or we shall soon find ourselves distanced in the educational race by

some of our near neighbors who have had the same material difficulties to contend with as ourselves. Already our Canadian cousins seem to have gained a march upon us in having recently adopted a better classification of teachers an arrangement which is promising to have an excellent effect upon the schools as well as the instructors. Hear what it is:

In Canada, an inexperienced candidate is examined in the ordinary studies taught in elementary schools, and if successful receives a third grade certificate. After serving for two years, and presenting testimonials of success, the candidate may pass a more difficult examination, including some of the higher English branches, and receive a second grade certificate. At the end of three more years of successful experience the candidate may pass a still more difficult examination covering the studies persued in colleges, except languages, and receive a first grade certificate. In this manner, teachers are gradually promoted from grade to grade, the more experienced obtaining the higher class of schools and the best pay. There is something like system here, and the *nucleus* for a profession is thus readily formed. Experience goes hand in hand with scholarship; a step once gained is never lost, and the diligent and successful instructor is always assured of promotion. Thus teachers have a proper stimulus for their ambition, they are encouraged to do their best, and have sufficient inducements presented to make teaching a life-work, instead of as here, a stopping stone to something else. Moreover, when disabled from further service, by reason of sickness or old age they are entitled to a retiring allowance or pension at the rate of six dollars for every year they may have taught in the public schools of the Dominion.

Here then we have a solid foundation laid for a new profession, and without this, teaching will never amount to much anywhere. A profession cannot be composed mostly of juveniles—to render it worthy of public estimation it must embrace in its membership the different stages of life; for thus the fire of youth and the vigor of manhood's prime will

be mellowed and tempered in council by the ripened experience and wisdom of maturer years. It is time that we had begun to lay such a foundation here by following the example of our near relatives across the line.

POLITENESS is in business what stratagem is in war. It gives power to weakness, it supplies great deficiencies, and overcomes the enemy with but little sacrifice of time and blood. It is invincible either in the attack or defence.

SCHOOL DISCIPLINE.—The following things aid in securing good discipline and preventing disorder:

1. See that the school-room is well warmed, ventilated, cleansed and lighted, and adorned with pictures, mottoes, and flowers.
2. Give pupils plenty to do.
3. Approve work when well done.
4. Carefully inspect pupil's work.
5. Keep up an interest in work.
6. Few rules uniformly executed.
7. Frequent changes of exercise.
8. Control by kindness.
9. Make the school and its exercises popular.
10. Pile on motives.

—*Hamilton School Mag.*

WASHINGTON.

His was the true enthusiasm that burns domestically bright,
Fed from itself and shy of human sight,
The hidden force that makes a life time strong,
And not the short lived fuel of a song.

Passionless say you? What is passion for
But to sublime our natures and control,
To front heroic toils with late return,
Or none or such as shames the conqueror?

—*Lowell.*

CORRESPONDENCE.

SOLUTION OF PROBLEMS.

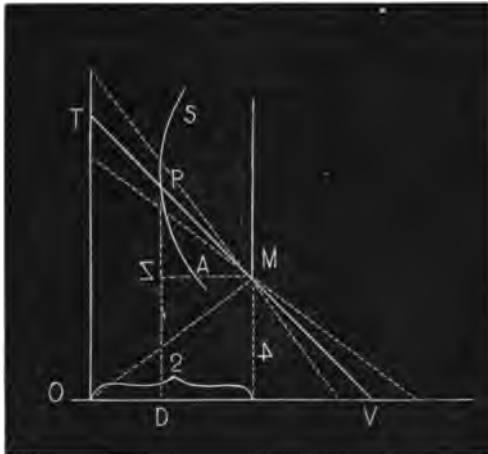
Editor Normal Teacher:

I desire to furnish a complete solution of Vol. III, No. 2, Q. 4, p. 63, the answer of which has been assumed by Mr. J. W. Jones in the July number of *THE NORMAL TEACHER*, as well as to investigate whether "any point of the rod describes the curve of an ellipse."

The question reads thus:

Required the longest inflexible rod that can be thrust up a chimney, the arch being 4 ft. high and the distance from the arch to the back of the chimney being 2 ft. (The back of the chimney to be vertical).

First to ascertain length of maximum rod.



$TO=y$, $VO=x$, $PD=y'$, $DO=x'$ and O , origin of co-ors. M is top of arch, $S P A$ is a portion of the locus of P , or a portion of the curve described by P any point on the inflexible rod $T P V$.

Let x' and y' be the coordinates of P . Now $TV^2 = x^2 + y^2$; and $y : x :: 4 : x-2 \therefore 4x = xy - 2y$, $x(4-y) = -2y$, and $x = \frac{2y}{y-4}$. Consequently TV^2 or $\bar{u}^2 = \frac{4y^2}{(y-4)^2} + y^2$. Differentiating with (y) as the independent variable we get $2u \frac{du}{dy} = \frac{8y(y-4)^2 - 2(y-4)4y^2}{(y-4)^4} + 2y \dots (1)$

Now since TV or (u) is a maximum $\frac{du}{dy} = 0$

Therefore the right hand member of equation (1) reduces to zero, from which we obtain

$$\frac{8y(y-4)^3 - 8y^2(y-4) + 2y(y-4)^4}{(y-4)^4} = 0; \text{cancelling by } (y-4)$$

$$\frac{8y(y-4) - 8y^2 + 2y(y-4)^3}{(y-4)^3} = 0; \text{multiplying off by } (y-4)^3 \text{ and dividing through by } 2y, \text{ we get}$$

$$4(y-4) - 4y + (y-4)^3 = 0$$

$$\text{or } y^3 - 12y^2 + 48y - 64 - 16 = 0; (y-4)^3 = 16$$

$$\text{and } y = 4 + \sqrt[3]{16} = 4 + 2\sqrt[3]{2}$$

This value of (y) substituted in (u) gives a negative result, thus indicating that $y = 4 + 2\sqrt[3]{2}$ when T V is the longest.

$$\text{Therefore since } x = \frac{2y}{y-4} = \frac{8 + 4\sqrt[3]{2}}{2\sqrt[3]{2}} = \frac{4 + 2\sqrt[3]{2}}{\sqrt[3]{2}}$$

$$\therefore T V^2 = \left(\frac{4 + 2\sqrt[3]{2}}{\sqrt[3]{2}} \right)^2 + (4 + 2\sqrt[3]{2})^2; \text{length squared of inflexible rod, which}$$

may be reduced and simplified still further, so as to conform exactly, I presume, with what I judge to be the formula employed by Mr. J. W. Jones. Second to obtain locus or curve described by P.

Representing length of rod by (l), from triangle P M Z we get $\frac{P M}{M Z} = \sec M$ or $\frac{1}{2-x} = \sec M = \sec V O M$ or $\frac{1}{2-x} = \sqrt{1 + \tan^2 O}$, but in triangle V O M, the tangent of V O M = $\frac{4}{5}$, since in any right angled triangle perpendicular divided by the base = tangent of angle of elevation.

$$\text{Therefore } \frac{1}{2-x} = \frac{5}{4}$$

But $l = \sqrt{(y-4)^2 + (x-2)^2}$; dropping the dots for the sake of convenience and remembering not to confound the coordinates of P with x and y already employed in first part of problem, we get

$$\sqrt{\frac{(y-4)^2 + (x-2)^2}{2-x}} = \frac{5}{4}; \text{squaring and arranging we get } (y-4)^2 + (x-2)^2 (1-5) = 0$$

or $y^2 + 4x^2 - 8y - 16x + 32 = 0$, which is the equation of the curve described by point P, since it is a relation between the coordinates of any pt. P on the curve.

Now applying the usual test for determining whether a conic is an ellipse, parabola or hyperbola, or using the one given in Salmon's Conic Sections we see at once that the curve is an ellipse, because B, the coefficient of xy is 0, A, the coefficient of x^2 is 4, and C, the coefficient of y^2 is 1, and therefore B^2 is less than 4 A C, since $0 < 16$. Consequently every point on inflexible rod with exception of extremities describes an ellipse.

I desire also to furnish a solution of question 4 in the recent July number, proposed by J. A. P.

$$\sqrt{x} - \sqrt{x} = 4$$

$$x^{\frac{1}{2}} - x^{\frac{1}{2}} = 4. \text{ Let } x = y^2 \therefore x^{\frac{1}{2}} = y, x^{\frac{1}{2}} = y$$

Substituting we get $y^2 - y^2 = 4$

$$y^2(y-1) = 4$$

or $y^2 : 4 :: 1 : y-1$. By division we get

$y^2 - 4 : y^2 :: -y + 2 : 1$. That is the difference between first and second : first, &c. Taking the products of extremes and means we get

$$(y^2 - 4) = -y^2(y - 2)$$

or $y + 2 = -y^2$, dividing by $y - 2$

$$y^2 + y = -2, y^2 + y + \frac{1}{4} = -\frac{9}{4} + \frac{1}{4} = -\frac{2}{1}$$

$$y + \frac{1}{2} = \pm \sqrt{-\frac{2}{1}}, y = \pm \sqrt{-7} - 1 \text{ and } y = 2$$

$$\text{squaring } y^2 = \frac{-7 \pm 2\sqrt{-7} + 1}{4} = \frac{-(6 \pm 2\sqrt{-7})}{4} = \frac{-(3 \pm \sqrt{-7})}{2}$$

$$\text{cubing } y^3 = \frac{-(27 \pm 27\sqrt{-7} - 63 \pm \sqrt{-243})}{8} = \frac{-(-36 \pm 27\sqrt{-7} \pm 7\sqrt{-7})}{8}$$

$$\text{Then simplifying further } y^3 = \frac{-(-36 \pm 34\sqrt{-7})}{8} = \frac{18 \pm 17\sqrt{-7}}{4}$$

$$\text{Then the values of } x \text{ are } \frac{18 \pm 17\sqrt{-7}}{4} \text{ and } 64$$

PAUL PELTIER.

COMPOUND PROPORTION AND CAUSE AND EFFECT.

Editor Normal Teacher:

I am really glad that some discussion has been elicited concerning the comparative merits of Compound Proportion and Cause and Effect, and Shorter Analysis. Discussion of methods is always indicative of progress. *How to present a subject so it is most easily understood*, is the leading idea of the best teachers. It is not the knowledge alone of books that makes a successful teacher but it is the method by which he presents it so as to secure the greatest mental development, sustain the most intense interest, and inculcate the most principles and facts. An instance that farther convinced one of this idea came under my observation this Summer. It was at a village school that had been taught by college graduates for years, had been governed to such an extent by the rod that it was said that not one had escaped its effects and when a young lady of sixteen only, who had never taught, entered the room to begin teaching she was kindly told by the Board that they would furnish her with rods if necessary. She taught her school without a rod, scold or frown. How did she accomplish it? Why, it was in the manner of presenting the subjects as has been repeatedly advocated in this Journal. That these methods gave entire satisfaction it is necessary to say that the lady has been engaged for both fall and winter terms. Smiles should pass back and forth between teachers and pupils in-

stead of frowns. If a teacher sees a pupil's eyes twinkle and countenance begin to beam as a result of the solution of a difficult problem and if he does not reciprocate it as he would greet his friend on the street he would certainly be cruel.

Now as to the methods of Compound proportion, cause and effect and Analysis I should like to have a free expression of opinions. I seldom if ever use the two former and use almost entirely the latter. If I am teaching false doctrine or using the worst method I desire to know it. Problems found in one of my previous articles are solved in July No. by cause and effect and claimed to be solved in a very brief time and with "no mental strain," all of which I readily grant, but is this the object, to work an example in "less than a minute" with no mental effort, making mere machines and book slaves?

If the "vertical line is a matter of taste and convenience," why are not operations in fractions requiring cancellation arranged with a vertical line? In fractions the numbers below and above the line are considered as divisor and dividend, and it would be illogical to deviate from this analogy as our knowledge in a great measure is only relative.

The writer says that the method is obscure in some instances but that *it matters not*. It would surely be discouraging to talk to pupils in that way. Why lug in this obscure, unnatural, and mechanical method? can a pupil understand why a number can be either a *cause* or an *effect* as suggested on page 183? or, changing the C and E as is done on next page? Simplicity and mental development should have some regard in the manipulation of Arithmetical problems.

J. E. BAKER.

CRITICISMS.

Editor Normal Teacher:

In your issue of May I noticed among your corrected sentences the following: "John," says I, "mind your p's and q's." Now, if that sentence is correct, all the text-books should, at once, be thrown away, and new ones introduced. I also notice that the expression. If it rain, is, in a peremptory manner, ruled out of our vocabularies, and If it rains, is said to be correct. Whether If it rains, is correct, or not, depends entirely upon what idea the speaker intends to convey. If he means that it may *now* be raining, or it may not be raining, but if it is *raining*, I shall not go, then If it rains, is correct. The writers of the article in question arrays Dr. Webster against Harvey in support of his doctrine, but it must be borne in mind that neither Webster, Harvey, nor any other author, can be regarded as the *standard*. Present good usage is the *only* standard, and according to the *standard* If it rain, expresses the same idea as If it shall rain, and is unquestionably correct. Webster only recommends that suitable auxiliaries be used, but never intimates that the present indicative (form) after a conjunction should be used to express a future contingent event—never. Both forms are correct, when properly used; both forms are needed by every one who wishes to use the English language with force, beauty, and elegance. Our best writers and speakers in the proportion of nine to one never fail to distinguish the subjunctive form from the indicative. Our language is barren of inflections and consequently, there is a scarcity of verbal forms, therefore we need both forms, because they differ by a beautiful shade of meaning. Because a few innovationists are willing to degrade their own language by dropping these beautiful and necessary inflections, is that a sufficient reason for leaving the King's highway?

Alabama.

M. SMITH.

NOTES AND QUERIES.

MATHEMATICS.

1. A man sells two cows; upon one he gains 30%, upon the other he loses 50%. He loses \$24.00. What is the cost price of each cow?

F. L. SUILWELL, *Austinburg, O.*

2. A man has a square yard containing $\frac{1}{10}$ of an acre; he makes a gravel walk around it which occupies $\frac{1}{4}$ of the whole yard. What is the width of the walk? Algebraic solution desired.

O. F. MORGAN.

3. What is the side of a cube which contains as many cubic inches as there are square inches in one of its faces.

ERGON, *Elrod, Ind.*

4. Find the least number which is divisible by 9 without a remainder, and which, when divided by 7 leaves a remainder of 4.

LIBRA.

5. Give an algebraical solution of the following geometrical problem: The base, the sum of the squares of the other two sides, and the rectangle contained by the segments of one of those sides made by the perpendicular falling from the opposite angle, being given, to determine the triangle.

Id.

6. Having bought goods for \$90.00, I sell them 4 months afterwards for \$125.00. What is the gain % per annum?

Id.

7. Taking any number of two or more places of digits, show that that number must leave the same remainder when divided by 9, that the sum of its digits does?

Id.

8. Approximate, by the method of continued fractions to the value of $\sqrt{11}$ and show that the difference between any two of the consecutive fractions in the result has unity for its numerator.

Id.

9. A farmer buys a flock of sheep at the rate of \$35.00 for every 5 sheep; he afterwards loses 9, and sells the remainder at the rate of \$80.00 for every 11, and the sum for which he sells the flock is \$120 more than that which he gave for it. How many sheep were there?

Id.

GRAMMAR.

Analyze and parse italicized words;

1. This is—what shall we call *it*?

S. E. N.

2. It is he, *even he*.

Id.

3. He was not *even* invited *to be* present

Id.

4. Our island home is *far* beyond the sea.

Id.

MISCELLANEOUS.

1. What were the names of the "Seven wise men of Greece," and when did they live?

ERGON, *Elrod, Ind.*

ANSWERS.

1. [Vol. III, No. 5, Q. 1, p. 187.]

Love thy neighbor as thyself.

Ans. As conj. adverb belonging to love, has the meaning of *manner*. *Love thy neighbor in the manner that you would yourself.* *Thyself* is a pronoun personal objective after love.

{ [You]
[love | neighbor | thy
as thyself.

E. P. CLEMENS.

2. [Vol. III, No. 5, Q. 1, p. 187.]

Name the states of Mexico.

Ans. 1, Sonora; 2, Chihuahua; 3, Cohahuila; 5, Nuevoleon; 5, Tamaulipas; 6, Cinaloa; 7, Durango; 8, Guadalupe; 8, Zacateras; 10, San Luis Potosi; 11, Guanajuato; 12, Yucuetaro; 13, Mexico; 14, Veracruz; 15, Lapuebla; 16, Oaxaca; 17, Tehuantepec; 18, Guerrero; 19, Leolima; 20, Tabasco; 21, Chiapas; 22, Yucatan.

Id.

3. [Vol. III, No. 5, Q. 2, p. 187.]

What rate of interest is paid when a note due in 30 days is discounted in bank at 6%?

Ans. Assume \$100 as the base then the int. of \$100 at .06 for 33 days = .55, which we call the discount, \$100 - .55 = \$99.45 prin.

Int. of prin. \$99.45 for yr. @ .01 = 9945.

\$6.00 + .9945 = 6.9945%.

Id.

4. [Vol. III, No. 5, Q. 3, p. 187.]

If my retail gain is $33\frac{1}{3}\%$, and I sell at wholesale for 10% less than at retail, what is my gain % at wholesale?

Ans. $1.00 + 33\frac{1}{3} = 1.33\frac{1}{3}$; $1.00 - 10 = 90$; $1.33\frac{1}{3} \times 90 = 1.20$. \therefore gain % is $120\% - 100\% = 20\%$.

Id.

5. [Vol. II, No. 10, Q. 4, p. 328.]

Where is the highest point in Indiana, and how high is it above the sea level? Also the average height of Indiana above sea level?

Ans. The highest point in Indiana is near the eastern line of Rush Co., between Sand and Salt creeks. It is 1057 ft. above sea level. Also, the average height of Indiana is 678 ft. above sea level.

ERGON, Elrod, Ind.

6. [Vol. III, No. 3, Q. 5, p. 106.]

When and by whom was the decimal point introduced?

Ans. The decimal point is said to have been introduced by Lord Napier, in 1602.

Id.

NOTES.

Editor Normal Teacher:

In the July number of THE NORMAL TEACHER there is an *ommission* on my part or a *typographical error* to the solution of a published problem.

[Vol. III, No. 2, Q. 4, p. 63.]

Required the longest inflexible rod that can be thrust up a chimney, the arch being 4 ft. high and 2 ft. from the arch to the back of the chimney. (The back of the chimney to be straight).

Ans. Any point of the rod describes the curve of an ellipse as it moves up the chimney between two fixed planes at right angles to each other;

hence we have $4^3 \times 2 = 32$; $\sqrt[3]{32} = 3.1748$ ft; also $2^3 \times 4 = 16$; $\sqrt[3]{16} = 2.5198$ ft.
 $3.1748 + 2 = 5.1748$; $2.5198 + 4 = 6.5198$; $\sqrt{5.1748^2 + 6.5198^2} = 8.3238$ feet =
 length of rod.

J. W. JONES.

Editor Normal Teacher:

Mr. L. B. Fraker has sent me problems No. 6 and 20, and I, at his request, send you the solutions.

Problem No. 6: "Three men, A, B and C, start together on a journey of 40 miles. A travels with horses and carriage, B and C on foot. A travels at the rate of 8 miles per hour, B 6 miles, and C 4 miles. A travels to his journey's end, drives back until he meets B and carries him a certain distance, then again retraces his steps until he meets C, and carries him to his journey's end. How far must he carry C that they may all get through at the same time?"

Solution: A will complete his journey in 5 hours at which time B is at the 30th mile, and C at the 20th. Now when A starts back, if he pay no attention to B, he will meet C at $26\frac{2}{3}$ miles from the start, having traveled $6\frac{2}{3}$ hours altogether. He then takes up C, and in $1\frac{3}{4}$ hours more, or $8\frac{1}{2}$ hours from the start they arrive at their journey's end. But as B can travel the 40 miles in $6\frac{2}{3}$ hours, he has been there already $1\frac{3}{4}$ hrs.; in fact, he finished his 40 miles at the same instant that A meets C. Hence we see that A must give B a *back set* of $1\frac{3}{4}$ hours as he goes back to meet C. Now the only question to decide is, how far can A carry B at the rate of 8 miles per hour, so that he may walk back at the rate of 6 miles per hour, and occupy just $1\frac{3}{4}$ hours? This is easily found as follows: He consumes $\frac{1}{2}$ of an hour in riding one mile, and $\frac{1}{3}$ of an hour in walking a mile. He can therefore go as many miles in $1\frac{3}{4}$ hours as $\frac{1}{2} + \frac{1}{3}$ or $\frac{5}{6}$ is contained times in $1\frac{3}{4}$. $\frac{5}{6} + \frac{5}{6} = 5\frac{1}{3}$ miles. Hence A must carry B *back* $5\frac{1}{3}$ miles, and carry C *forward* $13\frac{1}{3}$ miles.

No. 20 is as follows: "The shadow of an object at noon on the 21st of March is four times as long as the object. If the object stands perpendicular to the horizon, what is the latitude of the place?"

Solution: The shadow, the object and the rays of the sun will form a right-angled triangle all of whose elements are easily found. But we care to know only the angle which the sun's rays make with the horizon, or in other words, how many degrees the sun is *above* the horizon, and we do so thus: Base of triangle : Radius :: length of object is to tangent of required angle, or $4 : 1 :: 1 : \text{tang. } x$, hence $\text{tang. } x = .25$ which we find to correspond to an angle of $14^\circ 2' 11''$ nearly. Now suppose the sun to be on the equator at noon; to a person at the poles it will appear to be on the horizon. As said person travels toward the equator the sun will appear to rise in the horizon. And when the person has gone from the pole $14^\circ 2' 11''$ the sun will be the same distance above the horizon. Hence the required latitude will be $90^\circ - 14^\circ 2' 11''$ or $75^\circ 57' 49''$ either north or south.

Of course in this solution the sun is supposed to be on the equator exactly at noon, and the effect of refraction is omitted.

J. C. GREGG.

We supposed him to be a *soldier*.

Soldier, noun, obj. in the predicate with the intransitive verb *to be* referring to the same thing as its subject *him*.

I desire to be a *soldier*.

Soldier, noun, *nom.* in the predicate with *to be*, referring to the same thing as its subject, (myself) understood.

In the latter sentence the subject of the infinitive *to be* is the same as the subject of the finite verb *desire*.

HOW SHALL WE MAKE OUR LANGUAGE WORK MORE PRACTICAL?

As it is near the time for schools to begin work, a few words on practical language teaching may not be out of place.

One of the worst and *truest* things that can be said of our work in this branch is that *it is not practical*. And yet to make a Grammar class practical workers is to make that class lively and interesting; and surely this latter is what every teacher desires, though he may not think of the former. The only thing that will cause a person to use good English is *to use it*. That is, he must constantly try to make his language correct, instead of spending all his school days in learning *how* to correct it. If an apprentice should spend all his time in learning the *names* of tools and in being *told* how to use them he would use them very awkwardly when he has "learned his trade." So when a pupil spends all his time learning *technicalities* in language and listening to *lectures* by the teacher, he uses language awkwardly when he has "finished his education." We should make *every recitation* a practical language lesson. If we decline, conjugate, analyze, parse, and correct the sentences in the book, and use careless language in all other recitations, on the play-ground and in general conversation, very little benefit is gained, and it will not be strange if some pupil is heard to say: "I don't see any sense in Grammar."

An excellent teacher used to say to her class: "*I do wish* you would recite without quarreling so much with your grammars." Another would step to the blackboard and write an incorrect sentence used by some pupil in recitation. All teachers should remember that the greatest object for which we should labor in the school-room is the gaining of what can be used after leaving school; and no true teacher will be satisfied with a mere *book* recitation, although it may "show off" well and be considered by many as a model recitation.

The following plan has been successfully used and is given for the benefit of others: Have each pupil provided with pencil and blank paper, and when he hears what he thinks or knows to be incorrect language, let him make a note of it and present it in recitation for correction and discussion. This every-day drill, and avoiding as much as possible the "quarrels with the grammars," will prove a great benefit. More time spent in this way and less spent in wrestling with such sentences as those given above will lead to better results. Fellow teacher, try it.

EDITORIAL NOTES.

WE should be glad if all our readers *could* have nice and attractive school-rooms in which to teach. Nothing will so inspire teacher and pupils in their work as pleasant surroundings. Bare walls and floor and uncurtained windows are uninviting and soon become dull and monotonous. Every teacher should do something, nay much, toward rendering the school-room attractive. A very little time and work spent in the right direction will transform a dirty, uninviting school-room into one pleasant and attractive. Every school-room should be supplied with a few plants. The geranium is a hardy grower and requires but little attention and is therefore well adapted for the school-room. Other plants not so hardy perhaps as the geranium can be carried safely through the winter by covering them at night before leaving the room, with a newspaper or by removing them from the different parts of the room to the stove. Your school-room should also be supplied with a few pictures and mottoes. You do not need many but you do need a few, say half dozen of each. A school-room kept clean and sweet and adorned with a few plants, pictures, maps and mottoes can not fail to add an additional charm to the work of both teacher and pupils. We hope that every one of our readers will see to it that the school-rooms in which they are to teach are put in good order and, that they present a neat and attractive appearance before the opening of the school. It will richly pay you to spend the week before your term opens in forming acquaintances of parents and pupils and in getting your school-room in proper order. By all means get things in good shape beforehand for your fall and winter work. You can not afford to neglect this preparation. Too much depends upon it.

WE are reminded by the above of a little personal experience in which the spirit of a whole school was transformed. We opened school, "a stranger in a strange land." The room was bare, the seats old, whittled and scarred; blackboard picked and marked as if it had been bombarded with grape shot; stove a regular bulletin done in chalk, and other things to correspond. When a new shovel was purchased it was said that it was'n't worth while to carry it there for nothing ever lasted more than a week. Pointers and pokers were snapped with equal readiness and promptness; buckets and tin cups alike passed away, maps, or any thing in short, that might be taken there, not excepting books, were dispatched in short order by these youthful barbarians, so it was said. Here indeed was a field of labor, an opening for one's ingenuity, and we set to work; we called the boys young men and the girls young ladies, addressing and treating them as such, and thus appealed to, their self-respect began to manifest itself in various ways. The heads were smoother as to the hair, and some of the larger ones went so far as to assume clean paper collars on the strength of this one appeal. By a

few quiet thrusts, hints or suggestions, spitting on the floor was greatly mitigated. We had no special rules or lectures on manners, but kindly and naturally as occasions came up, led them into a finer perception of the relations of things, and what was fitting and becoming, and tried that our own spirit and example might be a quiet influence for better things. But to the point: We took up a collection in the school, hired one of our number to white wash the room one Saturday, blackened our stove and gradually put things in shape and furnished the room with all necessary appliances. Some we got ourselves and some we induced the directors to get, and all was done with the assistance of the pupils, to the end that they might take a personal interest in the care of them: we consulted their tastes and wishes and took council of them in many things and frequently asked their assistance. The result was, that before long, all were jealous in guarding what we had collected there and appreciated so much. Thus was laid the foundation on which, later, to build a higher æsthetical training. It was all new and made a deep impression on them.

We know there will be teachers beginning their schools this fall who will feel *blue* and say to themselves "O, well, what is the use for me to try to do anything in particular, away off here in this out-of-the-way-place? Who will there be to know or appreciate my work?" It will pay you in more ways than one to throw your energy into enlivening these waste places, and making the wilderness "blossom as the rose." In the first place you can not tell what great results may spring from your work here on the minds of the awkward, stupid and even vicious ones. Secondly one's works return to him again in the form of increased power and personal development. You will be better able to cope with greater difficulties; and third,

"Honor and shame from no condition rise;
Act well thy part, there all the honor lies."

To force success from hard circumstances is the measure of one's strength. It marks the great man and the hero. There is no honor in the highest position in the world save as its possession is the result of difficulties overcome, or the ensign of personal force and merit. By faithfulness in a few things we become rulers over many, and by earnestness in humble things we are fitted to handle great ones.

We receive letters sometimes from our County Superintendents telling us something of their work, plans and successes, and should be glad to receive more. There is, we are glad to note, a general movement in the direction of unifying and systematizing the schools of their counties. There has grown to be no doubt among the thinking and those forced to come face to face with these matters, that order and system are not only essential to the highest, but to *any* considerable success in the conduct of our public schools, just as in any thing else. This thing of leaving the isolated pedagogue to grapple alone with the difficulties of backwoods stations,

like missionaries of olden times, is about to end. The State expends her money and the State should have such supervision and laws as will see that it is well expended, and that teachers, paid for instructing the children of the State should not have to spend their time "dickering" with the whims of an ignorant neighborhood, and that the teacher may have the inspiration of being part of a living organization whose work will be looked into and appreciated, and if criticised, it will be by those who are capable of judging. Our County Boards are adopting and arranging for the carrying out of a regular course of study, and holding Normal Institutes during the summer, in which programmes for carrying out the year's work are discussed, and directions and instructions given for grading the schools and carrying on the daily order of work. It is true we need more explicit and better laws for the carrying out of school system, but our friends show wisdom and thrift in going forward, doing all that can be done within the limits of the law, and construing it most favorably to advancement. Thus will be brought to light any need of legislation, and just what legislation is necessary; how *much* system is necessary to the highest good of the schools, and what is necessary to protect such system. It will be the part of our Normal training to keep burning in teachers the living flame which will prevent system from becoming mere form and protect children from being regarded as so many *things*; which will enkindle and keep alive sympathy and feeling, which will in short be the soul of our well regulated system. We shall be glad to hear from our friends on any phase of this great work of *systematizing our schools*.

"BEFORE a teacher can set about his professional work intelligently, and with assurance of success, he must not only understand its technical details, but he should also have a broad and comprehensive knowledge of the general objects of education, and the means by which these are to be accomplished."

Good schools are not always kept in costly school-houses, and not always most praised. They are orderly and industrious; cleanly in language and morals. They are thorough and scholarly, they tend to build up character; to make the boys who attend them manly, and the girls womanly.—*Boltwood*.

As nothing astonishes men so much as common sense and plain dealing, so nothing is more rare in any man than an act of his own.—*Emerson*.

VIRTUOUS intelligence is more reliable and far less costly to the State or community than vicious ignorance.—*Am. Journal of Education*.

EXAMINATION DEPARTMENT.

QUESTIONS PREPARED BY THE INDIANA STATE BOARD OF EDUCATION, FOR THE EXAMINATION OF TEACHERS IN JULY, 1880.

WRITING.

1. How many grades or classes in writing would you form in an ordinary country school? Why? 2 pts., 5 each.
2. Name the principal positions at the desk and explain them. 2 pts., 5 each.
3. What is the regular slant for writing, and how may it be shown? 2 pts., 5 each.
4. Explain the construction of the small *a*. 10.
5. Are all of the short letters of the same height? Name exceptions, if any. 2 pts., 5 each.

Write this couplet as a specimen of your writing:

"Maud Muller, on a summer's day,
Raked the meadow sweet with hay."

1 to 50.

Let the penmanship of the candidate as shown in the answers to the above questions be marked from 1 to 50 according to the judgment of the Superintendent.

SPELLING.

1. What are the relative merits and demerits of "written spelling" compared with "oral spelling" in school? 10.
2. What is the benefit of practice in spelling by sound? 10.
3. Indicate by the proper diacritical marks for the sounds of the letters in the following words: *was, there, here, come, dog*. 10.
4. Spell 20 words pronounced by the examiner. 70.

READING.

1. Define oral reading.
2. State three ways of expressing emphasis. 3 pts., 3½ each.
3. State the different steps that should be taken in conducting a reading lesson in the Fourth Reader. 10.
4. Does the kind of mark of punctuation employed in printed composition determine to any extent the inflection of voice appropriate to the oral reading of it? State reasons in full for your answer. 10.
5. Make a thought analysis of the following poem by stating (1) what the poem is; (2) what was the purpose of the author in writing it; (3) what is the effect produced upon you by reading it.

THE MOUNTAIN AND SQUIRREL.

1. The Mountain and the squirrel
Had a quarrel,
And the former called the latter "Little Prig."
2. Bun replied:
"You are doubtless very big;
But all sorts of things and weather
Must be taken in together
To make up a year,
And a sphere;
3. And I think it no disgrace
To occupy my place.
If I'm not so large as you,
You are not so small as I,
And not half so spry;
I'll not deny you make
A very pretty squirrel-track.
Talents differ; all is well and wisely put;
If I cannot carry forests on my back
Neither can you crack a nut."

—*Ralph Waldo Emerson.*

6. The applicant should read orally a selection made by the examiner, upon which he may receive from 1 to 50 per cent.

ARITHMETIC.

1. What number is that which being $\times 8$, the product less 4 being $\times 14$, and this product $+25$ being $+5$, gives a quotient of 61? Proc., 5; Ans., 5.
2. A gentleman left the city A, and after traveling two days on the same parallel, reached the city B. His watch, which kept the correct time of the city A, showed that it was 12 M, when it was only 10.30 A. M. by the time at B. In which direction did he travel? How many degrees?
Proc., 5; Ans., 5.
3. If 1.2 decimeters of carpet cost 25 cents, what will 94 hectometers cost? Proc., 5; Ans., 5.
4. In 4 T 3 hhd. 8 gal. how many pints? Proc., 5; Ans., 5.
5. The amount of \$1200 for 1 yr. 2 mo. 12 da. is \$1263. What is the rate? 10.
6. A tax of \$95935 is levied on a city, the assessed valuation of which is \$7,674,800. What is the rate? Proc., 5; Ans., 5.
7. What is the least number of even pounds which I can use of sugar at 7 cents a pound, and sugar at 11 cents a pound to make a mixture worth 10 cents a pound? Proc., 5; Ans., 5.
8. Find the side of a cubical mound equal to one 288 ft. long, 64 ft. broad, and 48 ft. high. Proc., 5; Ans., 5.
9. What is the area of the convex surface of a cylinder whose altitude is 10 ft, and the diameter of the base 4 feet? Proc., 5; Ans., 5.
10. When should help be given to pupils in the solution of problems in arithmetic? How should that be given?

GRAMMAR.

1. Correct: *I will not do it for John's sake, and parse sake.* 2 pts., 5 each.
2. Punctuate and capitalize: a man could not set his foot down says cortez unless on the corpse of an indian. 10.
3. Night coming on, we gave up the chase. Parse *night* and *on*. 2 pts., 5 each.
4. Analyze the above sentence. 10.
5. Give the principal parts of *fly, get, new, but, lie* (to recline.) 5 pts., 2 each.
6. Decline *which* 10.
7. Write a sentence containing a verb in the infinitive mood as a subject and a prepositional phrase in the predicate. 10.
8. "I'll look no more
Lest my brain turn and the deficient sight
Topple down headlong."
Parse *no* and *lest*. 2 pts., 5 each.
9. In the sentence above parse *topple* and *headlong*. 2 pts., 5 each.
10. Correct: Riding on horse back or rowing a skiff are good exercise.
There was no memoranda kept of the sales. 2 pts., 5 each.

GEOGRAPHY.

1. In what zones are there four seasons? Why? 2 pts., 4, 6.
2. What is the difference between a plateau and a plain? 10.
3. How do you account for the descent of iceburgs from the Artic Ocean into the Atlantic Ocean, while the force of the Gulf Stream is so great northwardly? 10.
4. What is the general character of the inimals in the northern parts of N. America? 10.
5. How does the amount of rainfall on the Atlantic Coast compare with that on the Pacific Coast? 10.
6. Name one chief production of each of the following states: S. Carolina, Virginia, Indiana, Pennsylvania, Colorado. 5 pts., 2 each.
7. What bodies of water are joined by the Suez canal? What are the commercial advantages of this canal? 2 pts., 4, 6.
8. For what are the following cities respectively noted? London, Paris, Rome, Venice, Munich. 5 pts., 2 each.
9. What three great empires are in Asia? Which is the most important? Which is the most populous? 5 pts., 2 each.
- 10.

Country or State.	Capital.	Chief Prod't.	Chief Man.	Chief Industry.	Chief River.
France.					
Great Brit.					

10 pts., 1 each.

HISTORY.

1. What is the value of globes and maps in learning and teaching history? 10.
2. Where were the circumstances of President Harrison's death? 10.
3. Name five prominent battles of the Mexican War. 5 pts., 2 each.
4. How was the northern boundry of Oregon settled, 1846? 10.
5. What was the chief event of President Taylor's administration? 10.
6. What immediately led to the secession of the Southern States and the Civil War? 10.
7. What efforts were made for the reconciliation of the North and South, 1860, 1861? 10.
8. (a) When and (b) where was the Southern Confederacy organized? 2 pts., 5 each.
9. Describe the assassination of President Lincoln, 1865. 10.
10. What is the best way for a teacher to gain a good knowledge of U. S. History? 10.

PHYSIOLOGY.

1. By what two experiments can you prove the composition of bone? 2 pts., 5 each.
2. What is your opinion of the often asserted physical degeneracy of man? Why do you think so?
3. Why is walking a better exercise for a student than carriage-driving? 10.
4. Upon what does the complexion depend? What rule would you give as to the use of cosmetics for its improvement? Why? 3 pts., 4 off for each one.
5. Is general custom of shutting out all light from the sick room right or wrong? Why do you think so? 2 pts., 5 each.
6. Should the quantity of food taken be comparatively greater in youth or mature age? Why? 2 pts., 5 each.
7. What effect upon digestion have strong emotions or great fatigue? Why? 2 pts., 5 each.
8. What is the function of the diaphragm in respiration? 10.
9. Why should we breath through the nostrils rather than through the mouth?
10. What rules would you give as to the care and cleansing of the eyes and eyelids after long continued use of them, especially at night? Why? 2 pts., 5 each.

THEORY AND PRACTICE.

Write a page or more on the care of the school-room, including heating, ventilation, sweeping and dusting, the care of maps and apparatus, the decoration of the room, etc.

NOTE.—The paper written by the applicant should be marked on a scale of 1 to 100. The number, value and correctness of the statements made should be considered.

ANSWERS TO STATE BOARD QUESTIONS FOR JULY,
1880.

IN SPECIAL CHARGE OF ANNIE M. SHERRILL.

The Number of the Answer Corresponds to the Number of the Question.

WRITING.

1. But one. Because there is no time or necessity for more in an ordinary country school. All should write at the same time and all can with equal profit drill on the same letter, word, principle, or what ever the exercise may be.

2. The *Left Position* is that of the left side to the desk. The left forearm is advanced from four to six inches upon the desk and is parallel with its edge. The *Right Position* requires the right side to be placed near to the desk but not in contact with it, and the right arm should be parallel to the edge of the desk and rest upon the muscles just below the elbow and the body erect. The left arm must be at right-angles to the right and rest upon the paper or book which must be kept parallel with the edge of the desk.

In the *Right Oblique Position*, the right side is nearer the desk but does not touch it. The right arm is placed obliquely upon the desk resting upon the muscles below the elbow, the left arm at right angles to the right. The *Front Position* consists in sitting directly in front of the desk, keeping both sides equally distant from it. Paper at an angle of 20° to the edge of desk; hands at right-angles to one another.

3. At an angle of 52° with the horizontal or base line. This degree of slant is shown by drawing a circle with the base line passing through the center and marking the degrees upon the circle then connecting the 52° with center by a straight line. This straight line will have the proper slant.

4. The small *a* is one space in high and one in width. A left curve beginning at the ruled line, extends upward on an angle of 27° , and rises to the high of one space, where it unites with a second left curve, which retraces the first one-half its length. At this point three-fourths of a space from the ruled line, it separates from the first left curve and continues to the ruled line, the entire second left curve being on a slant of 34° . It is joined at the base by a lower turn to a right curve which proceeds upward meeting the two left curves, and joining angularly with a straight line descends on the regular slant, uniting in a turn at the base with a right curve which proceeds upward one space and completes the letter.—*Spencerian Key to Practical Penmanship*.

5. The short letters are not all of the same high, *r* and *s* are the exceptions.

SPELLING.

1. In written spelling lessons we have the use of the hand as an aid to memory. In proper oral spelling the proper pronunciation of words is more forcible.

ly impressed in the division of the syllables and calling of the word. But now that diacritical marks are being taught and used in connection with the written spelling the value of the exercise is greatly increased and should we think in connection with written language lessons, and drills in *phonics*, do away with oral spelling as it has been generally taught (?) in the past.

2. The benefits of spelling by sound are: to train the organs of hearing so that the children may readily distinguish the sounds heard in speaking; to train the organs of hearing so that the pupils may learn to produce the sounds correctly in using language. To acquire an articulation which shall be at once accurate and tasteful, it is necessary:

(1.) To obtain an exact knowledge of the elementary sounds of the language.

(2.) To apply this knowledge constantly in conversing, reading and speaking, with a view to correct every deviation from propriety which we may detect in expressing them.—*De Graff*.

READING.

1. Oral reading is giving utterance to the thought and feeling contained in written language.

2. By an increase of force or stress; by a change in quality, form pitch, or movement, or by a change in the combination of two or more of these attributes.—*Hamill*.

3. First to interest the class concerning the author, his home and history, together with the circumstances and occasion of his writing the passage in hand. Second, to master the pronunciation and meaning of the words. Third, to master the meaning of the passage. Fourth, to drill upon the natural and correct reading of the selection.

4. To some extent, but only slightly. These marks divide the sentence to bring out the sense but so many modifications vary composition that they are by no means a guide as to inflection of voice.

ARITHMETIC.

$$1. \quad 61 \times 5 = 305. \quad 305 - 25 = 280. \quad 280 + 14 = 294. \quad 294 \div 4 = 73.5. \quad 73 + 8 = 81.5.$$

2. 1 hr. 30 min. = dif. of time of the two cities, which is equivalent to $22^{\circ} 30'$ long. B having 1 hour 30 min. earlier time is therefore $22^{\circ} 30'$ west of A.

$$3. \quad 1 \text{ hectometer} = 1000 \text{ decimeters.}$$

$$94 \quad " \quad = 1000 \times 94 = 94000 \text{ dec. M.}$$

If 1.2 dec. M cost 25 cts., 1 dec. M will cost $\frac{25}{1.2}$. And 94000 dec. M will cost $94000 \times \frac{25}{1.2} = \1958.33 .

$$4. \quad 4 \times 4 = 16 = \text{no. hhd. in } 4 \text{ T.}$$

$$16 \text{ hhd.} + 3 \text{ hhd.} = 19 \text{ hhd.}$$

$$19 \times 63 = 1197 = \text{no. gal. in } 19 \text{ hhd.}$$

$$1197 \text{ gal.} + 8 \text{ gal.} = 1205 \text{ gal.}$$

$$1205 \times 4 = 4820 = \text{no. qt. in } 1205 \text{ gal.}$$

$$4820 \times 2 = 9640 = \text{no. pts. in } 4820 \text{ qt.}$$

5. $\$1263 - \$1200 = 63 = \text{int. for given time.}$
 $\$14.40 = \text{int. at } 1\% \text{ for given time.}$
 $\$63 \div \$14.40 = 4\frac{1}{2} = \text{rate } \% \text{ required.}$
6. $\$95935$ is as many $\%$ of $\$7,674,800$ as 1% of $\$7,694,800$ is contained times in $\$95935$. 1% of $\$7,674,800$ is 76748 .
 $76748 \div 95935 = 1 \frac{1}{2}$
7. In selling sugar at 10 cts., 1 ct. $\frac{7}{8}$ lb is lost on the 11 ct. sugar and 3 cts. $\frac{7}{8}$ lb gained on the 7 ct. sugar. To equalize the quantities as to price, three times as much of 11 ct. sugar must be used to each unit of the mixture, as of the 7 ct. sugar. Therefore, 1 lb of 7 ct. and 3 lbs of 11 ct. sugar are required.
8. $288 \times 64 \times 48 = 8847,736 = \text{no. cu. ft. in the mound.}$
 $\sqrt[3]{8847736} = 96 = \text{no. ft. in one side.}$
9. $A1 = 10 \text{ ft. } R = \text{base} = 2 \text{ ft.}$
 $2 \times 10 \times 2 \times 3.1416 = 125.6640 = \text{no. sq. ft. in convex surface.}$
10. Help should always be given at the time of assigning the lesson, through the medium of the preliminary drill, and all the difficult points should be brought out in the recitation of said lesson, but the time of the school should not be taken out side of recitation for individual instruction. Let such be given outside of school hours.

GRAMMAR.

1. The sentence is not necessarily incorrect as in the following connection: Do this for John's sake. I will *not* do it for John's sake, but if it means I *forbear* for John's sake, then it should be. For John's sake I will not do it.

Sake is a noun, com., 3d., sing., neut., obj. case, obj. of prep. *for*.

2. "A man could not set his foot down," says Cortez, "unless on the corpse of an Indian."

3. Night, noun, com., 3d., sing., neut., nominative absolute with the participle *coming*. *On*, an adv., limits coming.

4. Night coming on we gave up the chase, is a simple declarative sentence of which *We* is the simple subj., unmodified and *gave up the chase* the complex pred., of which *gave up* (a compound verb) is the simple pred., modified by *the chase* a complex obj. element of the first class, of which *chase*, the base, is modified by *the*, a simple adj. element of the first class. Night-coming on is an independent phrase.

5. Fly, flew, flown, get, got, gotten, lie, lay lain.

6. Nom., which, poss., whose, obj., which.

7. *To go* would be of no use.

8. *No* is an adverb, limiting more. *Lest*, a conjunction, connects the two clauses.

9. *Topple*, verb, reg., intrans., act., subjunctive mood, 1st., sing., to agree with sub., *I*. *Headlong*, an adv., modifies *topple*.

10. Riding on horse back or rowing a skiff is good exercise. There were no memoranda kept of the sales.

GEOGRAPHY.

1. The four seasons are found only in the Temperate Zones.

There are four seasons in these zones because the Earth is so inclined to the plane of its orbit that in its revolution around the sun the rays strike these parts with different degrees of obliquity.

2. A plateau is a broad extent of *high* land; a plain is a broad extent of land not much above the level of the sea.

3. The *Greenland Current* passes along America and unites with the Gulf Stream near the banks of Newfoundland, and another current from the North unites with the Gulf Stream between America and Europe. These currents carry icebergs as far south as the 40th degree of north latitude before they are melted. These currents are formed from the current passing through Behring Strait and around the northern coast of N. A.

4. Animal life near the poles is chiefly marine. The land animals are largely fur-bearing.

5. The rainfall on the Atlantic coast is greater than that of the Pacific coast.

6. Rice; tobacco; grain; iron; gold.

7. Mediterranean Sea and Red Sea. The distance, by water, from the Atlantic Ocean to the Indian Ocean is greatly shortened.

8. Population, wealth and commerce; gaiety and fashions; age, buildings, former greatness, and being the seat of the Roman Catholic Church; canals; its great university.

9. Empire of Japan, Chinese Empire, and British Empire. British Empire. Chinese Empire.

	Capital.	Chief Prod't.	Chief M'f'g.	Chief Ind's'y.	Chief River.
France.	Paris.	Grain & Fruit.	Silk, Woolens and Wine.	Agriculture, Manufacturing Commerce.	Reine Loire.
Great Britain.	London.	Iron, Coal and Grain.	Cutlery and Cloth.	Commerce Agriculture, Manufacturing	Thames.

HISTORY.

1. To locate places in connection with events.

2. Every thing promised well for the new Whig administration; but before Congress could convene the venerable President, bending under the weight of sixty-eight years, fell sick, and died just one month after his inauguration. It was the first time such a calamity had befallen the American people and profound and universal grief was manifested at the sad event.—*Ridpath*.

3. Battle of Palo Alto; Resaca de la Palma; Monterey; Buena Vista; Cerro Gordo.

4. In convention of the two powers (Great Britain and the U. S.) held June, 1846, the question was definitely settled by treaty. Every point of the

long-standing controversy was decided in favor of Great Britain. The 49th parallel was established as the international boundary line from the summit of the Rocky Mountains to the middle of the channel which separates the continent from Vancouver's Island; thence southerly through the middle of said channel and of Fuca's Straits to the Pacific.

5. The department of Secretary of the Interior was created, shortly after his death which occurred before the close of his term, the Omnibus Bill was passed.

6. The election of a Northern man for President.

7. The inaugural message of President Lincoln was full of expressions of good will toward the South, urging that he had no lawful right and no inclination to interfere with slavery.—*Harper's History*.

8. (a) July 20, 1861. (b) At Richmond, Va.

9. On the 4th of March, 1865, President Lincoln attended Ford's Theater with his wife and a party of friends. As the play drew near its close, a disreputable actor, named John Wilkes Booth, stole unnoticed into the President's box, leveled a pistol at his head and shot him through the brain. Mr. Lincoln fell forward in his seat, was borne from the building, lingered in an unconscious state until the following morning and died.—*Ridpath*.

10. To gather facts and dates with a view to answering the questions at a teacher's examination is by no means to *know* U. S. History. One should study its events and growth philosophically, with reference to their cause and effect. While by frequent reference one may familiarize himself with obscure facts and numerous dates, such familiarity is no evidence of either a profound knowledge of, or ability to teach history.

PHYSIOLOGY.

1. The animal matter can be shown by soaking the bone in acid to remove the earthy matter. The earthy matter may be shown by burning in fire to remove the animal matter.

2. It is a fallacy. Because it is not supported by facts while the contrary is supported by facts.

3. Because it calls the muscles into play and promotes that rapidity of circulation of the blood which is necessary for "purifying" the system, more effectually than carriage-driving does.

4. Upon the healthful circulation of the blood. A safe rule for the use of cosmetics is to let them alone, since they are liable to be poison and in any case interfere with the action of the pores of the skin.

5. It is wrong because the chemical influence of the sun is necessary to the restoration of the sick as is also the cheerfulness of it.

6. Children usually eat more than adults because they are growing while the waste is almost as great.

7. The process of digestion is suspended by strong emotion and great fatigue. Because the blood is called to the brain, or to repair the waste of fatigue.

8. By the action of the abdominal muscles the diaphragm is pressed against the lungs and thus expels the air.

9. That the air may become somewhat warm before coming in contact with the lining of the lungs and that dust, &c., may be detained from entering the lungs.

10. It is a good rule to bathe the eyes in water after using them any great length of time.

THEORY AND PRACTICE.

The heating, ventilation, sweeping and dusting should be as carefully attended to as any other work of the school as quite as much comfort and success depend upon these as upon any other duties. Where it is at all practicable some one should be employed to do the work of janitor, and that too by the trustee or directors. A good teacher earns his money in teaching without soiling his clothes or spending his time at such work. Nevertheless I would not stay in a dirty, dusty school house but would get it cleaned some how. The heating and ventilation of the rooms of our district schools must be carefully attended to by the teacher himself. On the care of Apparatus, Decoration, &c., see *Editorial Notes*.

EDUCATION is an essential element of republican government.—*Am. Journal of Education*.

THE influence of good schools is immeasurable. Their intelligent support at any reasonable cost, is wise economy, and the highway to success and greatness in life.—*Am. Journal of Education*.

OF the endless chain of time the little link of to-day is always with us; and we should take warning to-day by the mis-deeds of yesterday that they may not be repeated to-morrow.—*Teacher's Guide*.

THOSE were golden words which Charlotte Cushman once addressed to the friend of a lady who desired to go on the stage: "Tell her for me, that if she is going to try that work simply because she can think of nothing else to do, she will never succeed. But if it is the one thing above all others that she desires to do, and that she will do with her whole soul, she may try." The teacher who enters the school-room for no higher motive than self-support, and who can feel no enthusiasm for its labors, may well take these words to heart, success that is only tolerable, is next to intolerable. Not even the drudgery of the profession can be properly performed by unwilling hands, while its higher demands can only be met in the spirit of devoted self-sacrifice. Only a patient and stout-hearted learner can ever become an especially successful teacher.—*Shermerhorn's Monthly*.

PUBLISHER'S DEPARTMENT.

WE hope for an immediate renewal of all whose subscriptions have recently expired.

OUR books have had and are still having a very large sale. Every teacher should have a full set of them before commencing school this fall.

SUBSCRIPTIONS are pouring in upon us at a rapid rate. As we are crowded with work, we hope that all of our friends will be patient with us while we are making up our new mailing books. All will get their paper in due time. Be patient, friends.

WE invite our readers to a perusal of our advertising columns this month. Many new advertisements appear and it will pay you well to read them all. In answering any of them please mention *THE NORMAL TEACHER*. This will be an advantage to you, to the advertiser and to ourself.

BOOK TABLE.

RECREATIONS IN ASTRONOMY, with Directions for Practical Experiments and Telescopic Work. By Henry White Warren, D. D., author of "Sights and Insights; or Knowledge by Travel," etc. With 83 Illustrations and Maps of Stars. 284 pp. New York: Harper & Brothers.

We can pronounce this work as a very successful effort to popularize the Science of Astronomy. Though one of the oldest studies of the sciences, Astronomy is at this day making greater advances than any other science. New discoveries are continually being made and new books must be prepared to record them. No science reveals higher achievements of the human mind or declares the glory of God in a greater degree than Astronomy. We give a few of the topics treated: *Creative Processes, Creative Progress, Astronomical Instruments, Celestial Measurements, The Sun, The Planets as Seen from Space, Shooting Stars, Meteors and Comets, The Planets as Individuals, The Nebular Hypothesis, Summary of Latest Discoveries and Conclusions, Explanation of Astronomical Symbols, Glossary of Astronomical Terms*. We can not see how a teacher can afford to be without this book and the general reader will find it a valuable addition to his library. The book is finely executed and amply illustrated with colored plates.

THE FAITH OF REASON, a Series of Discourses on the leading Topics of Religion. By John W. Chadwick, author of "The Bible of To-Day." Boston: Roberts Brothers. 254 pp.

This volume is neatly printed on good paper and tastefully bound. To those who know something of the author as a preacher the volume will

not need recommendation. To others, we can only say, that whether they may find all that he says in accord with their own views or not, they will find much food for thought in it. The language is elegant and pure and the reader will certainly lay down the book after its perusal with the thought that it is the spontaneous utterance of a noble and true lover of humanity.

NORMAL METHODS OF TEACHING, Containing a Brief Statement of the Principles and Methods of the Science and Art of Teaching, for the Use of Normal Classes and Private Students preparing themselves for Teachers. By Edward Brooks, Ph. D., Principal of the State Normal School, Millersville, Pa., and author of a Normal Series of Arithmetics. Lancaster, Pa: Normal Publishing Co. 504 pp. Price \$1.75.

This is a systematic and comprehensive work on the Science of Teaching. It will be of more value, however, to teachers of graded and high schools than it will be to the country teacher. It is filled with good suggestions. Yet combined as they are with a great deal of mere theory which will be of little use to the beginner, they will not be so readily grasped by the tyro teacher. Part I is a philosophic treatise on the general nature of education. Part II is on methods of teaching and includes, 1. Object Lessons. 2. Languages. 3. Mathematics. 4. Physical Science. 5. History. The teacher who would form a good library of works on Education should have this book.

A TREATISE ON PHYSIOLOGY AND HYGIENE for Educational Institutions and General Readers. Fully Illustrated. By Joseph C. Hutchinson, M. D., Pres. of the New York Pathological Soc., Surgeon to the Brooklyn City Hospital, &c. New York: Clark & Maynard.

It would seem almost impossible to produce better text-books on Physiology than some already in the field but on close examination of this work we are compelled to say that the author has certainly made some decided improvements. He has made a very judicious selection of matter, has told the story of the science in a very pleasant way and has presented the latest phases of the results of investigation. If we were to point out faults the only one we could call attention to is that valuable space is taken up and the true teacher is rather reflected upon by the questions at the bottom of the page and at the close of chapters. The teacher of to-day who must rely upon questions prepared in the text-book is to say the least very far behind the age. One peculiar, and we think excellent, feature of the book is the insertion at the close of each chapter notes composed of extracts from large standard works. A great deal of valuable information for reference is here crowded into small space. There is a chapter on the Microscope in the study of Physiology which is a valuable addition and touches a point not usually touched in text-books. The book is printed on fine tinted paper and is a beautiful specimen of typography and for such work this firm is noted.

THE NORMAL TEACHER.

VOL. III. DANVILLE, IND., OCTOBER, 1880. No. 8.

Written for The Normal Teacher.

SONG FOR THE SCHOOL-TEACHERS.

BY W. H. VENABLE.

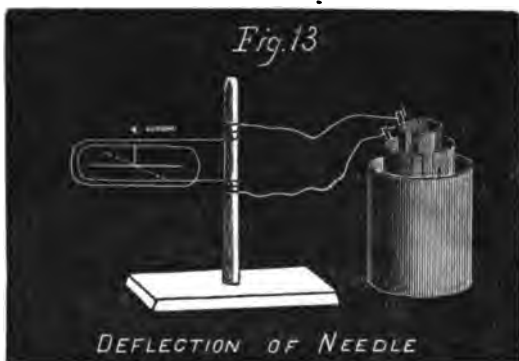
Benediction to teachers, first the ma'ams and then the masters,
And may they be exempted from delusions and disasters;
May their patience be recorded in enduring song and story,
May they win faithful labor, an eternal weight of glory;
Honor to the conscientious, the devoted, and the gentle,
Who blend in wise proportion moral excellence with mental;
Whose instruction is inducive of the spirit and the letter,
Of the truth that makes the learner daily happier and better.
Here's to the Great Cause: sing it through the land!
Stand by it cheerfully—resolutely stand;
Hail to the black-board, the spelling-book and pen,
For the children of the present are the Nation's coming men.

Benediction to the Free School, the common people's College;
Spread the golden grain of virtue and the vital seed of knowledge.
Hail to Liberty and Culture speeding on their holy mission,
And unto their opposers confusion and perdition;
Hurrah for equal justice to every rank and station,
And for the sovereign blessing—universal education.
Hurrah for the uplifting of every human creature,
Hurrah for the vocation of the earnest-hearted teacher!
Here's to the Great Cause; sing it through the land!
Stand by it joyfully—resolutely stand;
Hail to the black-board, the spelling-book and pen,
For the children of the present are the Nation's coming men.

CINCINNATI, O.

ELECTRIC EXPERIMENTS.

J. E. BAKER.



Deflection of Magnetic Needle.—The effect of an electric current upon a magnetized needle delicately suspended has been noticed in preceding experiments. It will also be observed that the needle always turns in certain directions depending upon the position of the current. If the wire through which a moderate current is passing be held *below* the needle, it will turn aside; if it be held *above*, it will again turn aside but in the opposite direction. If the wire be held beside the needle, one end will dip; if held on the other side, the other end will dip, the needle always tending to set itself at right angles to the current, plainly showing that Chemical as well as Magnetic and Frictional electricity possesses the property of attraction and repulsion. The law of this action was first announced by the learned Ampere of France who lays down the following rule: *Suppose a small figure be placed in the circuit, the current entering by his feet and leaving by his head, then if his face be always toward the needle its north end will turn toward his left.* Now supposing the current to be passing through the wire from north to south then in accordance with the above rule we have the following propositions:

1. If the current be *above* the needle, the north end will be deflected or turned toward the east.
2. If *below* the needle, the north end will be deflected toward the west.
3. If *east* of the needle, the north end will dip.
4. If *west* of the needle, the north end will rise.

The deflections will be the opposite to those just mentioned if the current be made to pass from south to north.

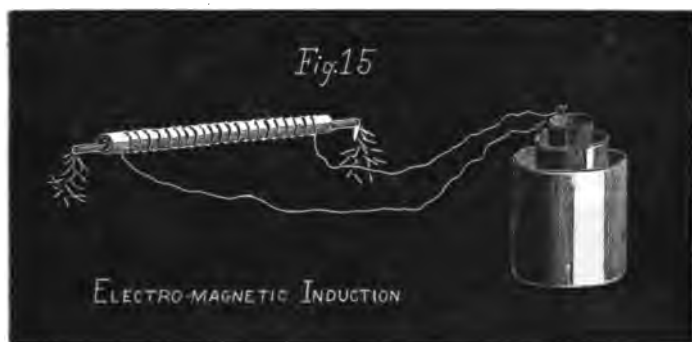
One current passing by a needle only causes a slight deflection but if the wire be bent so that the current passes around the needle the effect will be double since the current passing above and below the needle in opposite directions increases its effects instead of neutralizing them. If there be a greater number of bends the effect will be increased in proportion.

Figure 13 illustrates this effect. Bend copper wire round several times so that the different ends do not touch one another and suspend a magnetized needle within the coil as shown in the figure. The wires are wound around the upright several times to make the coil stationary. Attach the wires to a battery and the deflection at once occurs. Remove the attachment and notice the deflection in the opposite direction, thus proving the law.



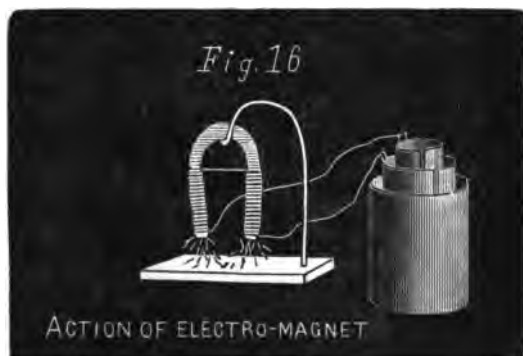
Galvanometer.—In the preceding experiments the deflection of the needle will be very slight in using a single or even two or three turns. The greater the number of turns the greater will be the deflection; so with several hundred turns a very feeble current would deflect the needle. A continuance of this character is called a galvanometer and is used to detect the presence of an electric current and determine its direction and strength. It requires but very little skill or effort to construct one that will answer all practical purposes.

es. It consists simply in wrapping a small pasteboard box with three or four hundred turns of covered copper wire about No. 30, and suspending within the coil a magnetized darning needle as represented in figure 14. The needle can be more conveniently suspended by running it through a small piece of postal card and attaching the thread to this. Place the coil thus arranged on a level surface as a table so that the needle and wire of the coil extend in a north and south direction. So the wires of this galvanometer connect the wires of a battery. The strength or intensity of the current will be indicated by the amount of the deflection and its direction can be determined by the application of Ampere's rule. By this means the action of the feeblest battery can be made manifest. It makes the most satisfactory test for the action of batteries before classes and those who are inclined to doubt.



Electro-magnetic Induction.—Another curious effect of the current is that of making iron magnetic. Take a glass, paste-board, or wooden tube five or six inches long and about half an inch in diameter and wrap it with covered copper wire as shown in figure 15. Connect the ends of the wires with a battery and place in the tube a soft iron rod or soft iron wires. The soft iron at once becomes magnetized as show by its attraction of nails or needles. If the iron be soft the magnetism will only be *temporary* for as soon as one of the wires is separated from the battery the nails or needles

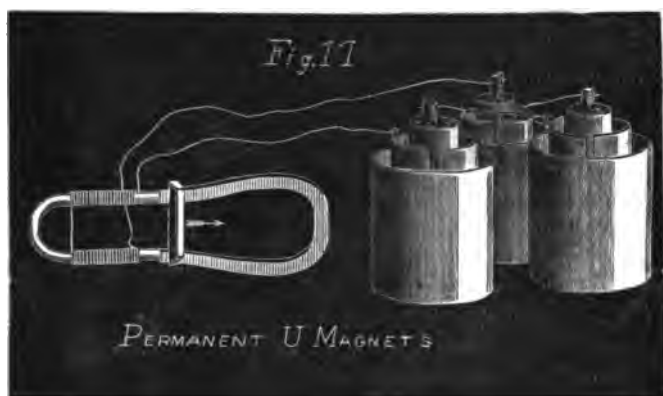
at once fall. Magnetism produced by the action of an electric current is called *Electro-magnetic Induction*.



Electro-magnets.—These are made upon the same principle of *Electro-magnetic Induction*. Take a rod of soft iron about half inch in diameter and seven or eight inches long. Have a blacksmith to shape it in the form of the letter U and file the two ends smooth. Then heat again and bury it in dry ashes or dirt allowing it to remain several hours so that it will cool gradually. After it is cold file the ends smooth again. For twenty-five cents a sufficient quantity of covered copper wire can be purchased from any philosophical instrument maker. Wrap the covered wire round the ends of the iron nearly to the bend, the direction of windings being such that, were the rod straightened, the wire would be continuous in its direction throughout as in figure 16. Hang the electro-magnet on a support, scrape the free ends of the wires clean and firmly connect them with the wires of a sulphate of copper battery which is the most convenient form of battery for experiments with electro-magnets. If iron filings, needles or nails be placed below the electro-magnet as shown in the figure they will at once be attracted and will also instantly drop as soon as the attachment with the battery is broken precisely in the same manner as in the experiment illustrating electro-magnetic induction.

If a nail or soft piece of iron with a flat surface be placed

against the ends or poles of the electro-magnet it will be removed with difficulty. Electro-magnets far surpass ordinary or permanent magnets in strength. It is said that Joule of England in 1840 made electro-magnets that supported 3500 times their own weight. Sturgeon of England appears to have been the originator of the electro-magnet, (1825), and its surprising usefulness made manifest in the electro-magnetic telegraph.



Permanent Magnets.—A good permanent magnet depends chiefly upon the kind of steel used. "The most uniform and fine-grained cast-steel, wrought with as little disturbance of its particles as possible, forms the best magnets." In the experiment illustrating electro-magnetic induction, if a bar or rod of steel be used instead of the iron wires, the steel will be permanently magnified. Or, the bar or rod may be itself wrapped with about 25 feet of covered copper wire the wires connected with three or four of Bunsen's batteries. The cups may be grouped together as shown in figure 17 by connecting the zinc of one with the coke of next, and so on. U or horseshoe magnets may be made in the same manner; or, perhaps a better method is that shown in figure 17. Place the steel to be magnetized against an electro-magnet and draw a piece of soft iron in the direction of the arrow beyond the curve, then replace and repeat

several times. Now turn both magnets over without separating the poles and treat in the same way. Permanent magnets have been made in this manner capable of supporting 26 times their own weight.

To preserve the strength of the U magnet it is essential that its ends or poles be joined by a keeper or armature of soft iron made to fit the smooth ends closely.

KNIGHTHOOD.

T. A. PUGH.

In Scott's School History the reader will find a picture in which Queen Elizabeth is represented as conferring the honor of Knighthood upon Raleigh.

A really live teacher will not be content to pass that without giving his pupils some idea of how such honor is conferred upon certain individuals.

Besides inspiring confidence upon the part of the pupils it will awaken thought, and induce them to read other books. The preparation needed on the part of the teacher is to read some book on the subject; such as Webster's Unabridged. If he has no book of his own, he must borrow one an evening or two and then return it. In order to be a success the teacher must be well-fortified. He must be backed up with knowledge and information. He must read, or starve. "His knowledge must be as the loaded gun in the hands of the marksman—as the Farnese Hercules leaning on his club, passive but ready for action, yet only wanting the word of command." Knighthood, was originally a species of honor conferred on those who had distinguished themselves by their bravery in battle.

The ceremony by which the honor of Knighthood was conferred was called the *accolade*.

The etymology of this word explains itself. *Ad*, upon; and *collum*, the neck. Hence the person upon whom the

honor was conferred, received a blow of the flat of a sword on the neck while kneeling. (It is not certain whether the candidate received a blow or an embrace.) According to Brande, the privilege of conferring Knighthood, belonged originally to the sovereign; but the most distinguished Knights were allowed to confer it. There were Knights-Bachelors, Knights-Bannerets, Esquire, Chevalier, and Knights-Errant.

The Knights-Bachelors were a lower order of the Knights. The Knights-Bannerets were obliged to serve in war, and carry a banner. An Esquire became an intervening officer between the Knights and the simple gentleman. The Squire also had the appellation, *groom*, from the circumstance that one of his duties was to attend to his master's horse.

The Orders of Knighthood are of two classes:

First, Associations possessing property and rights of their own as independent bodies.

Second, Associations established by Sovereigns within their respective dominions.

At the beginning of the 12th century an order of religious persons known as the Knights-Templars was founded, for the protection of Pilgrims on the roads in Palestine. Afterward it took for its chief object the protection of the Holy Sepulcher at Jerusalem against the Saracens. The Teutonic Order had for its object the performance of service against the Infidels of Palestine.

This Order was founded in 1190 by Frederick, duke of Swabia. The Order of the Garter, formally called the *Order of St. George*, the institution of which is ascribed to Richard I., who tied thongs of leather, as marks of distinction, around the legs of several of his officers at the siege of Acre. In volume II. of Hume, the institution of this Order is ascribed to Edward III., because the King picked up a lady's garter at a ball. The only Order that is hereditary, is the Order of Baronets instituted by King James I., in 1611, as a reward for the services of those who came forward to quell the insurrection in Ireland.

After the accolade is performed, the title, *Sir*, is prefixed to the Christian name of the candidate. Napoleon, when first consul of France, instituted an order known as the Legion of Honor, for merit, military and civil.

Mock battles, called Tournaments were practiced by the Knights, in which none but those of noble birth were permitted to engage.

If two were engaged, the contest was called a Joust, each Knight being armed with lances. The ancient Knights held their Jousts and Tournaments in inclosed fields which they called Lists. Hence, *to enter the lists*, means to engage in a contest. In a Joust, the contending Knights took their stations at opposite ends of the lists, and having couched their lances on the saddle-bows, they rushed together each aiming the point of his spear at the armor which protected the breast of his antagonist.

The term Tilting is used when the Knights ride at full speed.

Our word *emblazon* is supposed to be derived from the German *blasen*, to *blow*, and to have originated in the ceremonial of tournaments—it having been customary, on these solemn occasions, for the herald to blow a trumpet when he called out the arms of a Knight on ushering him into the lists.

Now, the practical side of this article is this:

The information herein given, is intended to induce teachers to read, not only about the very interesting subject of Knighthood, but to subject himself to the preparation of *all* he professes to teach. To come before his classes brimfull of the subject. Collateral information is good seed sown. Let us have more collateral instruction. Bring it in at the *side*. Do not forget to review. Bring this *outside* information in at the right time. Say nothing about Knighthood in the recitation in Proportion. If you do not take delight in working something new for your pupils, you are not doing your duty. Are you? They should know these things *now*, because they will take our places after while. I close with this request to every teacher: *Be sure that none of your pupils go home in the evening unless they know more than they did in the morning.*

CORRESPONDENCE.

A NEW METHOD FOR INTEREST.

Editor Normal Teacher:

The following rule may be used in finding the simple interest of any sum for any time and rate: *As an interest year is to the time for which the interest is required, so is the rate per cent. for the time, to the per cent. for one yr. With this equivalent rate we find the interest of the principal for one year.*

An interest year may be defined as one yr., 12 mo., 360 da., or the like; but the rule applies the same in the several cases.

Now, to illustrate this subject, what rate for one yr. would be equivalent to 6% for 5 yrs.? We perceive at once that the equivalent rate would be $6\% \times 5$, or 30%. That is, the interest of any sum for 5 yrs. at 6% would be the same as the interest of the same sum for one yr. at 30%. In like manner, the int. of any sum for 180 da. at 6% = the int. of the same sum for one yr. at 3 per cent.; because 6 per cent. $\times \frac{180}{360} = 3$ per cent. On any sum for one day at 10 per cent., the equivalent rate would be $10\% \times \frac{1}{360}$, or $\frac{1}{36}$ of 1%. We may find the equivalent rate by proportion, if preferred. Thus: An interest year (360 da.) : time required (40 da.) :: rate per cent. (.09) : per cent. for one yr. (.01.)

This truth is axiomatic, and, without further loss of time, we will pass to the solution of a problem in partial payments, to show the reader the superiority of this method over many of those—perhaps most—in common use.

\$1000.

Chapin, Jan. 1st., 1864.

For value received, I promise to pay, on demand, to Richard Roe or order, ONE THOUSAND DOLLARS, with interest at 10%.

JOHN DOE.

Indorsements as follows:

July 1st, 1865.....\$250.

Sept. 21st, 1866 ...\$210.

April 27th, 1868....\$496.

What was due April 27th, 1871?

We will now make a "time-table" *a la Rose*.

INTEREST @ 10%.

'64-1-1	—	—	—	\$1000.
'65-7-1	1-6-0	18 mo.	\$250.	\$ 900.
'66-9-21	1-2-20	440 da.	\$210.	\$ 800.
'68-4-27	1-7-6	576 da.	\$496.	\$ 432.
'71-4-27	3-0-0	3 yrs.	—	\$ 561.60.

Subtracting from the above downward, and placing the results in the second column, we get the times between several dates; in the third column the same reduced to the lowest denomination that occurs; the fourth contains the several payments in order; and the last, the face of the note, with the several "new" principals as obtained in the work to follow.

From the date of the note to the first payment is 18 mo. As 10% is the rate, the equivalent rate for one yr. is—

$$\begin{array}{rcl}
 10\% \times \frac{18}{12}, \text{ or } 15\% & \left\{ \begin{array}{l} \$1000 \\ .15 \\ \$150 \text{ int. 1 yr. at } 15\% = \text{int. 18 mo. at } 10\% \\ 1000 \\ \$1150 \text{ amt.} \\ 250 \text{ paym't to deduct.} \\ \$900 \text{ new prin.} \end{array} \right.
 \end{array}$$

$$\begin{array}{rcl}
 \text{Or thus: } 12 \text{ mo.} : 18 \text{ mo.} :: 10\% : 15\% & \left\{ \begin{array}{l} \$900 \\ .12\frac{1}{2} \\ \$110 \text{ int.} \\ \$900 \\ \$1010 \text{ am't.} \\ \$210 \text{ paym't to deduct.} \\ \$800 \text{ new prin.} \end{array} \right.
 \end{array}$$

$$\begin{array}{rcl}
 \text{The next time is 440 da. Hence} & \left\{ \begin{array}{l} \$800 \\ .16 \\ \$128 \text{ int.} \\ \$800 \\ \$928 \text{ amt.} \\ \$496 \text{ paym't to deduct.} \\ \$432 \text{ new prin.} \end{array} \right. \\
 10 \text{ per cent.} \times \frac{440}{360} = 12\frac{1}{3} \text{ per cent.} & &
 \end{array}$$

$$\begin{array}{rcl}
 \text{Or, } 360 \text{ da.} : 440 \text{ da.} :: 10\% : 12\frac{1}{3}\% & \left\{ \begin{array}{l} \$800 \\ .16 \\ \$128 \text{ int.} \\ \$800 \\ \$928 \text{ amt.} \\ \$496 \text{ paym't to deduct.} \\ \$432 \text{ new prin.} \end{array} \right. \\
 \text{The third time is 576 da. Hence} & & \\
 10 \text{ per cent.} \times \frac{576}{360} = 16 \text{ per cent.} & &
 \end{array}$$

$$\begin{array}{rcl}
 \text{The last time is 3 yrs. Hence} & \left\{ \begin{array}{l} \$432 \\ .30 \\ \$129.60 \text{ int.} \\ 432 \\ \$561.60 \text{ amt. or ans.} \end{array} \right. \\
 10 \text{ per cent.} \times 3 = 30 \text{ per cent.} & &
 \end{array}$$

The final test of all rules and methods is that of the school-room. To fail *here*, is to fail *in toto*. Our pupils have preferred the above to any other method, and with it have made the best progress. It is submitted to the readers of THE NORMAL TEACHER for—in the language of book agents—"examination with a view to introduction"—or rejection.

H. A. WITHEE.

MUSIC IN THE PUBLIC SCHOOLS.

Editor Normal Teacher:

The influence of song on the human race as a tendency to elevate and refine has been acknowledged by mankind for so long a time and has been used by the great teachers and leaders for so many ages that its power has become proverbial. Especially does this influence wield its control over the children and its use is too well known by the teachers to need an argument.

While the use of song in the school-room as a recitation only is commendable, it may be made fully as pleasant and at the same time more beneficial in its results by giving the pupils exercises in *reading* and *writing* music. This will not apply to the schools in the cities and larger towns which have for years been provided with vocal teachers who have special charge of this department.

But since the country schools are making gigantic strides toward a better system of education and more practical methods of imparting knowledge, and since it is through these that the masses are to be elevated, to these more directly are these suggestions applicable.

The time was and has been until recently that music was considered as an art, the acquisition of which to any extent whatever, required great natural talent and years of study and practice; in other words, musicians like poets were supposed to have been "born, not made." Within the past few years, however, the science of reading music has been simplified until the child of ten may be able to read plain music at sight. The ability of children to execute music is marvelous and known best to those who have had experience in teaching, and one-tenth of the money spent by the pupil in attempting to gain this accomplishment in after years if applied when a child from the age of six to fourteen, would be attended with better results than under the present system.

Another mistake which has taken possession of the minds of many and retarded the introduction of music into the schools, is that to teach the rudiments of music with any success one must be a thorough musician, skilled in rendering the most labyrinthine passages and able to execute the most intricate movements of the best composers. The fallacy of this opinion may be shown by illustration.

If a teacher is not fortunate enough to possess a thorough and complete knowledge of all branches of mathematics it does not necessarily follow that he is unfit to teach the first principles of Arithmetic. Neither does the lack of a knowledge of other languages imply that he is not capable of teaching English Grammar. A knowledge of these branches would be of great assistance, but a thorough understanding of the rudimentary principles enables him to teach a successful common school.

So in music, while a complete musical education is of great benefit, a correct understanding of the rudiments will enable the teacher to impart a knowledge to the pupil in a few months that would afterwards require years to obtain.

The great lack in this direction, as stated above, has been the want of a method or knowledge of *how to TEACH*. There are now several methods published by which any teacher can enable the pupils to read plain music, not only understandingly but at sight. One of the best methods that has come under the observation of the writer is one written by Messrs. Foote and Sile and published at Topeka, Kansas. This system has been used successfully in the public schools of that city and indeed throughout the entire State and is one of the most practical now in use.

There are several other methods that are entirely practical and have demonstrated the fact that the best time to learn music is in childhood and the best place in the public schools. From ten to fifteen minutes a day devoted to this study will, during the course of a few terms, enable the pupil to attain quite a proficiency in the knowledge of simple music and the time thus spent will increase the interest in other studies. The fact is becoming apparent to the best teachers that music has been under-rated in its influence and neglected to the detriment of the schools, and the near future will doubtless bring about a change in this respect that can not but result in improvement to our common schools, and in happiness to the children of America.

S. F. WISHARD.

SOLUTION OF PROBLEM.

Editor Normal Teacher:

Given

$$3(x^2 + y^2) = 2xy(x + y) \dots (1)$$

$$xy(x^2 - y^2) = 13(x - y) \dots (2) \quad \text{To find } x \text{ and } y.$$

[Vol. III, No. 6, Q. 2, p. 225].

Solution:

$$3(x^2 + y^2)xy(x^2 - y^2) = 2xy(x + y) \times 13(x - y); \text{ By multiplying (1) and 2}$$

$$\therefore 3(x^2 + y^2) = 26; \text{ by suppressing common factors}$$

$$x^2 + y^2 = \frac{26}{3} \dots (3); \text{ dividing by 3}$$

Substituting this value in (1), we get

$$26 = 2xq(x + y)$$

$$\therefore 2xy = \frac{26}{x + y} \dots (4)$$

Adding (3) and (4) we get

$$x^2 + 2xy + y^2 = (x + y)^2 = \frac{26}{3} + \frac{26}{x + y}$$

Putting s instead of $x + y$ we have

$$s^2 - \frac{26}{s} = \frac{26}{3}$$

$$\text{or } s^3 - \frac{26}{3}s = 26 \dots (5)$$

$$\text{Let } s = (v + z) \therefore (v + z)^3 - \frac{26}{3}(v + z) = 26 \dots (6)$$

$$\text{Expanding and arranging, } v^3 + z^3 + 3(vz - \frac{26}{3})(v + z) = 26 \dots (7)$$

Now since (v) and (z) are entirely arbitrary we may assume

$$vz - \frac{1}{4} = 0 \dots (8)$$

Therefore (6) reduces to, $v^2 + z^2 = 26 \dots (9)$

Then in (9), substituting for (z) its value $\frac{26}{9v}$ got from (8)

$$\text{we have } v^6 - 26v^2 = -\left(\frac{1}{4}\right)^2 \dots (10)$$

Completing the square and extracting the square root we have

$$v^3 - 13 = \pm \frac{1}{2}$$

$$\text{Whence } v^3 = \frac{27}{2} \text{ or } \frac{25}{2}$$

$$\therefore v = \sqrt[3]{\frac{27}{2}} \text{ or } \sqrt[3]{\frac{25}{2}}$$

Substituting these two values of v in (9)

$$\text{Then } z = \sqrt[3]{\frac{2}{3}} \text{ or } \sqrt[3]{\frac{2}{5}}$$

$$\text{Therefore } s = \sqrt[3]{676} + \sqrt[3]{26} = 3.912908 +$$

Now since $s = x + y$, by substituting in (4) for $x + y$ its value

$$xy = 3.322338 +$$

Since s is derivable from a cubic equation we ought to obtain two other values therefor. But before discussing that question let us see what are the values of x and y resulting from our single value for s or $x + y = 3.912908 +$

$$\text{Squaring this equation } \therefore x^2 + 2xy + y^2 = 15.310749$$

$$\text{Subtracting } 4xy = 13.289352$$

$$\text{Then } (x - y)^2 = 2.021397$$

$$x - y = \pm 1.421753 +$$

From which together with the value of $x + y$ we obtain

$$\left. \begin{array}{l} x = 2.667330 + \text{ or } 1.245577 + \\ \text{and } y = 1.245577 + \text{ or } 2.667330 + \end{array} \right\} \Delta$$

Both of which sets of values satisfy the original equations or their resultant (3); for $x^3 + y^3 = 7.115 + 1.551 = 8.666 + \frac{1}{4}$.

Now let us inquire how we may obtain the other two values of s from equation (5), and consequently remaining values of x and y. Since from (5) we have obtained one root or value for $s = 3.912908$ if we subtract this value from the coefficient of the second term we shall get the remaining two roots—their sum.

Now in $s^3 - \frac{1}{4}s = 26$ the coefficient of the second term is evidently zero, since the second term is wanting.

We thus get for the sum -3.912908

And since -26 is the product of the roots, if we divide this amount by $+3.912908$ we get for the product of the other two, $-6.6446 +$

Therefore the equation which contains them will be

$$s^3 + 3.912908s = 6.6446 +$$

$$\text{from which } s = 1.121292 \text{ or } -5.034200 +$$

Employing these two values of s in the manner, the first value was used we get

$$x + y = 1.121292; \quad x + y = -5.0342$$

$$xy = 11.5947 +; \quad xy = -2.5823$$

from the first of which sets or groups we get an imaginary expression for $x-y$; indicating that the resulting values of x and y will not satisfy the conditions of the problem.

From the second group, we get real values for x and y neither of which sets of values, however, satisfy the original equations. Group A is therefore the answer.

PAUL PELTIER.

WHAT IS WRONG WITH OUR HIGH SCHOOLS?

Editor Normal Teacher:

In our city, Plymouth, Ind., we enjoy the distinguished honor of having one of the most popular High Schools in the State. A class of young folks are sure to graduate at each Commencement. The members of the graduating class always graduate—none have been known to fail. Their per cents. secured at the competitive examinations for class honors are always way up among the 88 per cents. and 94 per cents.

Their essays and orations are generally scholarly productions and pretty generally delivered in an acceptable manner. Large and appreciative audiences always attend the Annual Commencement exercises, and our local papers are sure to devote an entire issue to a "boom" for our city school. Diplomas are awarded to the distinguished few. Showers of elegant bouquets surround them and in this happy state of mind they retire to dream of future conquests and feats of literary eminence.

The graduating exercises and all there is exciting and stimulating about it soon passes away and leaves the honored few standing alone in this critical world, for their Principal and Superintendent must go to work on the next best class in order to fetch them around for the Annual Commencement.

The graduates after a little rest naturally begin to look around for employment. Some of them, and I think the largest half, prefer to teach in our schools. To do this it is necessary to pass examination in only the common branches; Reading, Spelling, Writing, Arithmetic, Grammar, Geography, U. S. History, and Physiology, and the results of such County examinations afford sufficient excuse for the above interrogation.

These graduates when left alone seem unable to concentrate their knowledge on these simple branches, and usually secure low grades of scholarship, and several have been known to fail in even securing a fourth grade certificate from the County authority.

Mr. Editor, what is wrong? or, are you not willing to admit that there is any wrong?

A FRIEND OF OUR CITY SCHOOL.

We submit the question to our readers. We shall be glad to hear from any one on the subject. Probably the Principal and Supt. of the Plymouth Schools could answer the question.—[ED.]

EDITORIAL NOTES.

WHATEVER theories the young teacher may have when he stands before his first school, he will find that his first duty is to study and *accept* the facts before him. This is especially true with regard to the organization of the school. Preconceived notions as to the number of his classes must suffer all sorts of revision when the actual books brought in by the pupils are discovered. Indeed the best idea as to what classes are to be formed will be obtained by investigating as to the "books on hand." It is barely possible, though hardly probable, that the demand may be inside of his expectations. Whatever may be the case, the books brought by the pupils are the facts. Study them. Record them. Make your plans accordingly. A good and business-like way to get at this matter is to rule a large sheet of paper thus:

1. A small column for the number of the pupils.
2. Large one for their names.
3. A small one for their age.
4. Six small ones for 1st, 2d, 3d, 4th, 5th, and 6th reading classes.
5. Four small ones for as many Arithmetic classes.
6. Two for Grammar classes.
7. Two for Geography classes.
8. As many more columns as the page will hold for miscellaneous studies, such as Algebra, Geometry, U. S. History, Physiology, Natural Philosophy, Botany, Chemistry, Book-keeping, &c., &c. Make room for a young University.

Give these columns their proper heading. Have the sheet lying upon your desk. When the first pupil comes in, call him to you, kindly, inquire his name and age and record it on the sheet. Then ask him what reading class he was in last term. If he replies the Second, put a minus mark opposite his name in the Second Reader column. Then inquire what reader he expects to be in, and he will show you his book. If it be the Second, again, place a *plus* mark under the minus mark in the same column, or, if it be the Third, put a *plus* mark in that column. In the same way inquire about his other studies and record. So proceed with every pupil as he comes in. You will thus be able to make a record of your school before the hour of beginning so nearly complete that by using a little more time you can finish the record and be ready to make the "roll call" one of your opening exercises.

You will also have in your hand the members of the different classes. Thus, the plus marks in, say the Third Reader column, will be opposite the names of prospective members of that class. When the class is called, you can from your record call the roll as of a regularly organized class. So with the other classes. A good point in this management is that you have a business talk with your pupils at the very first. It is very difficult for a young teacher to so quell his embarrassment as to meet his pupils with

cheerful, familiar conversation. "Playing the agreeable" is the very last thing he feels like doing. But with business as a pretext, the agreeable can be slipped in, as it were, and without the distress of being formal.

With these data, the further organization of the school will be comparatively easy. In some future article we will suggest a suitable Daily Programme.

A GOOD public speaker always has his speech *prepared* for any given occasion, but he does not, by any means, always say what he had intended to. The inspiration of the audience and circumstances may warm him to entirely different and much better utterance than his preparation; but if the inspiration is not at hand his preparation saves him from failure.

So a good teacher will invariably have a plan for each recitation thought out clearly before the class appears. Yet, the presence of the class, the development of matters at the very outset or during the progress of the recitation may suggest a radical change, and very much for the better. This he does not fail to adopt, though prepared for something else. A good general always has a plan for the battle, though the first movement of the enemy may require an entire change. The preparation for a particular plan gives him the particular knowledge of the position and numbers of his troops necessary to a rapid change in his plans.

Thorough preparation is the foundation of all genius.

At the last meeting of the National Teachers' Association, a National Council of Education was organized. The matter was "set up" last February at the meeting of the Dept. of Superintendence at Washington, where a committee was appointed to prepare a plan of organization. This committee's plan was adopted at Chautauqua. The membership is restricted to fifty-one. No state is allowed to have more than eight members. The full constitution will be published with the proceedings.

Prof. Henkle in his monthly says: "It may be inquired what is the purpose of this council. Every one knows how easy it is to slip in resolutions and have them passed by Associations, although such resolutions may not at all express the sentiment of the Association. In some cases only two or three vote and there is a reluctance in starting a debate. The object of the National Council is to formulate results reached in educational discussion, and everything endorsed by the Council is intended to be a deliberate act passed as a result of mature consideration. We suggest that hereafter all resolutions, except of a business character, presented before the General Association be referred to the council, where if they are worthy they will receive proper attention. We trust that the formulations of the Council shall be so carefully done that they will always receive the cordial endorsement of the truest educators of the country."

So we have the Educational Congress differentiated from a unicameral into a bicameral body. The Association itself being now the lower house and the Council the upper house. The former the House of Commons,

the latter the House of Lords, so to speak. It would appear that the Association itself has heretofore been without any good result. Its decisions have not been and will not be entitled to any respect. This is rather severe on the great Congress of the American Educators. From what Prof. Henkle says, the future deliberations of the lower house are not entitled to weight until they receive the approval or stamp of the higher body. Will it not suggest itself to the body of teachers over the country that it will not be worth the expense and trouble to meet for the purpose of deciding important matters, when these matters are not to be considered decided? If the Council is the ultimate authority, why should they not take the initiatory as well? Are the teachers to assume to *play* a part, while the council are to do the real work?

Again, this Council is self-constituted and self-maintaining. Would it not have been better to have permitted the State Association to express some preference as to the membership and thus to have made it a representative body. We should like to hear some general discussion of this enterprise by the different journals. The Council would of course prefer that the matter be given as much publicity as possible, and that every form of criticism and objection be fully and freely offered so that in its movements it may really express the wishes of the teachers of the Nation.

THERE are all sorts of opinions as to the last Ohio Teachers' Association, holden at Chautauqua. Some pronounce it a fraud and a farce. Rooms that had been spoken for months ahead could not be obtained. Prices promised were not adhered to. Accommodations for the meeting were not sufficient, and the papers were less than ordinary. The circumstances were not at all favorable to social enjoyment. The red-tape and high prices spoiled the steam-boat rides. The weather was unpropitious, the grounds were low, damp, muddy, &c., &c.

While the *Ohio Educational Monthly* says it was "a grand success." "The papers read were fully up to the average." "Taking the meeting all in all it may be said to have been the most remarkable one ever held by Ohio Teachers." "The success of the meeting was mainly due to the untiring zeal of the President (Reuben McMillan), of the executive committee, W. B. Shattuc, and the Chautauqua Lake Navigation Company and the reduction of rates at the hotels." Why all this difference? Does somebody "know a thing or two," or is somebody disgruntled?

THE *Ohio Educational Monthly* says: "The Democratic party of Ohio did a wise thing in nominating the Hon. J. J. Burns as a candidate for reelection to the position which he has filled so faithfully and honorably. Mr. Burns has made many warm friends in the State and we should not be at all surprised to find him run ahead of his ticket. His official career has been such that he has compelled the respect of his political opponents." Will any Republican dare vote for Mr. Burns? Many would, doubtless, but dare they?

NOTES AND QUERIES.

MATHEMATICS.

1. $\sqrt{7-x} = 11-x^2$. Find value of x . B.
2. Explain why you change the signs in transposing numbers. Id.
3. I sold two horses for \$810, receiving $\frac{1}{4}$ as much for the first as for the second, and gaining $33\frac{1}{4}\%$ on the first and losing $11\frac{1}{4}\%$ on the second. How much did I gain? R. H. DODDS.
4. A and B start together to travel to a certain town. A, who travels 20 miles per day, after traveling 8 days, turns back to where B had traveled during those 8 days. A then resumes his forward journey and they both reach the town together in 16 days from the time they started. At what rate did B travel? Full solution required. Id.
5. Divide the fraction $\frac{44}{11}$ into two such parts that the sum of the numerators shall equal the sum of the denominators—and explain. B. F. R., *New London, O.*
6. About a point P in the circumference of a circle a straight line passing through P revolves at such a rate as to always be perpendicular to a radius revolving about the center of the circle. What is the locus of the point of intersection of these two lines?
7. A tub of butter weighs 30 lbs. by a grocer's scales, but on the other scale of the balance it weighed 36 lbs. What the true weight of butter? M. T. FLANNERY.
8. What amount in currency must I invest in U. S. 5-20's at 128 to secure a semi-annual income of \$200 in gold? E. M.
9. How must I invest U. S. 6-per cent. currency bonds, selling at 108, that I may receive an annual income of \$3900? Id.
10. A bank by discounting a note at $8\frac{1}{2}\%$ received for its money a discount equivalent to $8\frac{1}{2}\%$ interest. How long before due was the note discounted? Id.
11. I obtained a discount at a bank at 7 per cent. and left $\frac{1}{8}$ of the proceeds in the bank until the note was paid. At what rate did I get the money I used? Id.
12. If the cost of an article had been 8 per cent. less, the gain would have been 10 per cent. more, what was the gain per cent.? Id.
13. A man, through his broker, invested a certain sum in U. S. 5-20's at $107\frac{1}{2}\%$ per cent., and twice as much in 10-40's at $98\frac{1}{2}\%$ per cent., brokerage in each case $\frac{1}{2}\%$ per cent. His income from both investments was \$1,674. How much did he invest in each kind of stock? Id.
14. I had a 6 per cent. bond of \$800 dated Jan. 1, 1877, and due Jan. 1, 1878. On July 1, 1877, I sold the bond to Mr. Smith in such a way as to give him 8 per cent. on his investment. If Mr. Smith borrowed the money, needed to pay the note, from bank, at 10 per cent., for 90 days, what was the face of the bank note? Id.

$$z = \frac{1}{2} + \frac{1}{2}\sqrt{2} \quad \frac{1}{2} + \frac{1}{2}\sqrt{2} - \frac{1}{3 + \sqrt{21}} = y$$

$$\frac{1}{2} + \frac{1}{2}\sqrt{2} - \frac{1}{3 + \sqrt{21}} = y$$

Clearing of fractions I have

$$9 + 3\sqrt{21} + 3\sqrt{21} + 21 - 12 = y(36 + 12\sqrt{21})$$

$$18 + 6\sqrt{21} = (36 + 12\sqrt{21})y$$

$$y = \frac{18 + 6\sqrt{21}}{36 + 12\sqrt{21}} = \frac{1}{2}$$

$$w = \frac{1}{y}$$

$$w = \frac{1}{\frac{1}{2}} = 2$$

$$x^{\frac{1}{2}} = 2$$

$$x = (2)^2$$

$$x = 64.$$

2. [Vol. III, No. 6, Q. 3, p. 225.]*

Let x = greater

then $14 - x$ = less

$$\text{and } \frac{x}{14 - x} : \frac{14 - x}{x} :: 16 : 9$$

$$\text{and } \frac{9x}{14 - x} = \frac{16(14 - x)}{x}$$

$$\text{clearing of fractions } 9x^2 = 16(14 - x)^2$$

$$\text{Extracting square root } 3x = 4(14 - x)$$

$$\text{or } 3x = 56 - 4x$$

$$\text{transposing } 7x = 56$$

$$\text{whence } x = 8 \text{ or greater}$$

$$\text{and } 14 - x = 6 \text{ or less.}$$

*It is required to divide the number 14 into two such parts, that the quotient of the greater divided by the less, may be to the quotient of the less divided by the greater, as 16 : 9.

J. E. WHITE.

3. [Vol. III, No. 1, Q. 1, p. 21.]

I have some corn worth \$30. If the number of bushels be added to the price per bushel, each being considered for that purpose an abstract number, the sum will be 117½. How many bushels of corn have I, and at what price per bushel?

$$117\frac{1}{2} + 2 = 58\frac{1}{2}$$

$$(58\frac{1}{2})^2 = 3451\frac{1}{4}$$

$$3451\frac{1}{4} - 3000 = 451\frac{1}{4}$$

$$\sqrt{451\frac{1}{4}} = 21\frac{1}{2}$$

$$58\frac{1}{2} + 21\frac{1}{2} = 80 \text{ no. bu.}$$

$$58\frac{1}{2} - 21\frac{1}{2} = 37\frac{1}{2} \text{ price.}$$

J. I. STRAWN.

4. [Vol. II, No. 9, Q. 10, p. 281.]

A board contains 18 sq. ft., and is six times as long as it is wide. What is the length and width?

$$18+6=3. \sqrt{3}=1.732+\text{width. } 1.732+\times 6=10.492+\text{length.}$$

E. MILLER.

5. [Vol. III, No. 6, Q. 1, p. 225.]

He has a boy of *his own*.*His*, pro. 3d, sing. masc. poss. limits 'own.' Own, n. obj. of of.

J. W. WILHOIT.

6. [Vol. III, No. 5, Q. 2, p. 187.]

I must be *cruel only to be kind*.

{ I
must be cruel | to be kind | only.

Cruel is an adj. des., pos. deg., in the predicate, and limits "I."*Only* is an adv. of cause, and limits "kind."*To be* is a verb, irreg., be, was, been, intrans., act., inf., pres., cons. of an adv. and limits "cruel."*Kind* is an adj., des., pos. deg., in pred.; limits "I."

R. H. DODDS.

7. [Vol. III, No. 5, Q. 3, p. 187.]

There is no joy *but calm*.

{ (There)
joy { no
but calm
is [existing].

There is an expletive, the apparent subj. of "is."*But* is a prep. it shows the relation of "calm" to "joy."*Calm* is a noun, com., 3d., sing., neut., objective case, object of "but."*Id.*

8. [Vol. III, No. 6, Q. 4, p. 225].

Name the Cabinet officers of President Hayes.

Secretary of State—William M. Evarts.

" " Treasury—John Sherman.

" " War—George W. McCrary.

" " Navy—Richard Thompson.

" " Interior—Carl Schurz.

Postmaster-General—Horace Maynard.

Attorney-General—Charles Devens.

W. C. SPAULDING.

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NOTES.

Editor Normal Teacher:

Will you, or some of your contributors, answer the following questions:

1. Write in words 6,000; write in figures five hundred; which of these operations is notation, and which, if either, is numeration?

2. Our text-books tell that $\frac{3}{4}$ of $\frac{1}{2}$ is a compound fraction, and that $\frac{3}{4} \times \frac{1}{2}$ is a case of multiplication; what is the difference between the two expressions, either in operation or in sense?3. Should I say, $2+3$ are 5, or is 5; $7-4$ are 3 or is 3?

URIAH BIRD, W. Va.

Editor Normal Teacher:

I wish you would have an article in THE NORMAL TEACHER treating of the U. S. Bonds more fully than is contained in the Arithmetics; also an article on Savings Banks. I think these topics would be of general interest.

B. F. REMINGTON.

Will not some of our readers comply?—[ED.]

Editor Normal Teacher:

Will your readers look up and report upon the two following points in Geography?

M. Duc in his "Travels in Tartary, Thibet and China," 1845, says: "The bed of the Hoang-Ho has suffered very remarkable variations. In ancient times its mouth is said to have been in Lat. 39° N.; at present it is in 34° N." The Geographies reverse the statement. Which is right.

A correspondent of the Boston *Advertiser* writing from Ashville, N. C., July 8, says that in that mountain region (Black Mountains) there are thirty (30) peaks higher than Mt. Washington, N. H. Is this true?

X., Lancaster, N. H.

DEPARTMENT OF THEORY AND PRACTICE.

BY F. P. ADAMS, PRINCIPAL CENTRAL NORMAL COLLEGE, DANVILLE, IND.

MY TRAINING CLASS—MENTAL ARITHMETIC.—I.

September brings me again to my work in Training in Theory and Practice of Teaching. I meet a noble band of young persons from various parts with varied experiences and more varied notions of government and teaching. I shall try to give in a series of articles some conception of the work done this term, though it will of necessity be impossible to express *adequately* on paper the work of any class.

Our first lesson was given in Mental Arithmetic. A simple question was asked and solutions on paper or board required.

7 and 5 are how many?

Incorrect solution:

7 and 5 are how many.

as much as the sum of 7 and 5 which *are* 12.

therefore 7 and 5 are 12.

There are several mistakes in this work. There should be an interrogation sign after the question, *as* should be commenced with a capital, *much* should be *many*, there should be a comma after 5, in the solution, *are* should be *is* to agree with its singular subject *which*; *therefore* should be commenced with a capital and followed by a comma.

All these and more mistakes will be made by any pupil in the habit of giving only oral solutions. More time and attention should be given to written solutions of problems in Mental Arithmetic.

Corrected solution of the above:

7 and 5 are how many?

As many as the sum of 7 and 5, which is 12.

Therefore, 7 and 5 are 12.

4 times 5 are how many?

Incorrect solution:

As many as the product of 4 times 5, which are 20.

Or,

as many as the product of 4 by 5 which are 20.

Correct solution:

4 times 5 are how many?

As many as the product of 5 by 4, which is 20.

Therefore, 4 times 5 are 20.

At 4 cts. each what will 7 lead-pencils cost?

Incorrect solutions:

1. As much as the product of 7 times 4 cts., which are 28.

Errors: Times for by and are for is.

2. As many cts. as the product of 4 cts. by 7, which are 28 cts.

Errors: 4 cts., concrete, for 4, abstract; 28 cts., concrete, for 28, abstract.

Correct solutions of the same:

1. At 4 cts. each what will 7 lead-pencils cost?

As many cts. as the product of 4 by 7, which is 28.

Therefore, at 4 cts. each, 7 lead-pencils will cost 28 cts.

2. At 4 cts. each, what will 7 lead-pencils cost?

If 1 lead-pencil cost 4 cts., 7 will cost 7 times 4 cts., which are 28 cts.

Therefore, 7 lead-pencils at 4 cts. each will cost 28 cents.

If 3 lead-pencils cost 12 cts., what will 6 cost?

Incorrect solution:

1. 3 is contained in 12 cts. 4 cts. 6 times 4 cts. are 24 cts.

Therefore 6 lead-pencils will cost 24 cts.

Correct solution:

Question. If 3 lead-pencils cost 12 cts., what will 7 cost?

Analysis. If 3 lead-pencils cost 12 cts., 1 will cost $\frac{1}{3}$ of 12 cts., which is 4 cts.

Synthesis. If 1 lead-pencil cost 4 cts., 7 will cost 7 times 4 cts., which are 28 cts.

Conclusion. Therefore, if 3 lead pencils cost 12 cts., 7 will cost 28 cts.

The points to be noted and to receive especial attention, as developed by the class, are

1. To use few words.
2. To avoid redundancies.
3. To be accurate.
4. To prepare neat work on paper and board.
5. To punctuate correctly.
6. To capitalize properly.
7. To spell correctly.
8. To write a plain, business hand.

Remark. The point was made by a member of the class, that the work should be invariably put into shape suitable for the printer.

I shall develop a plan in a subsequent article by which the most complex and to students most perplexing problems in compound proportion may be reduced to a few questions in metal arithmetic, each one of which will be as simple as the last one solved above.

GRAMMAR DEPARTMENT.

"THE CONJUNCTION AS."

BY A. HOLBROOK, PRINCIPAL OF NATIONAL NORMAL SCHOOL, LEBANON, O.

The word *as* has more uses, perhaps, and is found in more parts of speech than any other in the language. Some grammarians, however, have insisted that *as* is always a conjunction, among whom is Bullions. I shall give a few examples to show that *as* is found in different parts of speech, and never as a pure conjunction.

1. *As*, an adverb. He wrote *as* I dictated. Here "*as*" is equivalent to "in the manner in which" and the sentence will then read, he wrote *in the manner in which* I dictated. *As* is plainly an adverb limiting both verbs, and connecting the sentences in the word *which*. It is better for the sake of simplicity in parsing and analysis, to consider "*as*" in such cases as introducing the adverbial clause, and limiting its verb; for the whole clause "*as* he dictated" simply is an adverb of manner showing "how he wrote."

2. *As*, an adverb. "To *as* many as received him to them gave he power to become the sons of God," the first *as* here simply limits the adjective "many."

3. *As* a conjunctive adverb. *As* he said so I believe. In this example so *as* are not simply correlative or corresponding conjunctions, but have an adverbial power, and the sentence is equivalent to "I believe in the manner in which he said."

4. *As*, a pronoun. In the second example, the second *as* is a relative pronoun. For, if we change the "*as* many" to "*all*," the sentence will then read, to *all who* received him, etc.

5. *As*, a pronoun. It was such a discourse *as* I never listened to before. If we change "*such*" to some equivalent word or expression, the sentence will read, it was *that kind* of a discourse *which* I never listened to before, *as* is thus shown to be a relative pronoun.

Let us see how it will read under the assumption that *as* is a conjunction, according to Bullions. It was such a discourse *as* that was which I never listened to before. It will be seen by careful reading, that *as*, even in this

arrangement is a relative pronoun in the predicate with the "was" supplied in the so called ellipsis.

6. *As*, a preposition. I like him *as* a teacher. Gould Brown claims that *as* in this sentence is a conjunction and connects words in opposition. Let us see. "*As* a teacher," is certainly an adverbial element and shows how "I like him." The expression is nearly equivalent to I like him *for* a teacher, but the exact equivalent is this, I like him *in the relation of* a teacher: *as* is thus equivalent to the complex preposition *in the relation of*.

Again. He came *as* a friend. Bullions would claim that *as* in this sentence is a conjunction, connecting clauses, and would supply an assumed ellipsis thus; he came *as* a friend came. This is evidently not the idea; for the sentence is designed to show in what relation he came, and not what he came like. Hence the sentence will correctly read, he came *in the relation* [or character] of a friend, and *as* is equivalent to the complex preposition "in the character of."

I have thus taken examples in which it is claimed with the most pertinacity that *as* is a conjunction, and shown as I think conclusively, that it is not a pure conjunction in any case.

As, a noun. *As* is never a pure conjunction. In this sentence *as* is a noun, being the name of a word, and the subject of "is."

Remark. *Like* is never correctly used in the sense of *as*. For example: "He walks like his father does." This should read: "He walks like his father," making *like* a preposition; or, "He walks *as* his father does," making *as* a conjunctive adverb.

THE best days of a man's life are those in which he effects the most good.

SOLEMN stolidity to the contrary notwithstanding, uniform cheerfulness is the most effective element of disciplinary power. A sick teacher may arouse sympathy, but he soon becomes tiresome. A worried teacher is his own worst worry. Pupils quickly comprehend the weakness of a passionate teacher. An indifferent teacher soon forfeits respect and authority. Sternness tempts tricks. Petulance provokes irritation.

But a constant, all-prevading, genial cheerfulness will win love. It means self-control and will command respect. It indicates character and will therefore prove the basis of genuine authority. It takes the zest completely out of the occupation of that youth who worries his teacher "just for the fun of it." Even the mistakes of carelessness will be looked over on account of kindness. It is worry that wears—not work.

Worry + Work = Leanness.
Winsomeness + Work = Fatness.

EXAMINATION DEPARTMENT.

QUESTIONS PREPARED BY THE INDIANA STATE BOARD OF EDUCATION, FOR THE EXAMINATION OF TEACHERS IN AUGUST, 1880.

WRITING.

1. What use would you make of the blackboard in the correction of errors frequently made by pupils? 10.
2. What is the entire width (in spaces) of m? 10.
3. What is the main slant in Spencerian penmanship? How does connective slant differ from main slant? 10.
4. How would you tell pupils to hold the pen? 10.
5. Write carefully all the capitals in which the capital stem (7th principle) is an essential part. 10.

Let the penmanship of the candidate as shown in the answers to the above questions be marked from 1 to 50 according to the judgment of the Superintendent.

ORTHOGRAPHY.

1. State the resemblances and differences between a Diphthong and a Digraph. 2 pts., 5 each.
2. (a) How many sounds may the letter *i* be used to represent? (b) Write a word illustrating each. 2pts., 5 each
3. In words of three or more syllables which syllable generally receives the principal accent? 10.
4. What is the meaning of the following abbreviations?—*inst.*; *id.*; *inf.*; *ſ. P.*; *Mss.* 5 pts., 2 each.
5. Add the suffix *able* to the following words, and state the rule for retaining or omitting the final *e* in each instance: *Notice*; *change*; *sale*; *debate*; *peace*. 5 pts., 2 each.
6. Spell correctly the following words:—*cyllinder*; *parallel*; *repealling*; *sinister*; *bilious*; *beleive*; *receive*; *dieing*; *billion*; *gimblet*. 10 pts., 5 each.

READING.

"Ring out wild bells to the wild sky,
The flying cloud, the frosty light!
The year is dying, in the night;
Ring out wild bells and let him die."

—From "*New Year's Eve*," by Tennyson.

1. State whether the author of this quotation is living at this time, and in what country he was born. 2 pts., 5 each.
2. State in your own language the meaning of the first two lines.
3. What inflection of the voice should be given at sky; cloud; light; night; and die. 2 pts., 5 each.

4. Indicate the sounds in the following words, using diacritical marks when necessary:—frosty ; essay ; false ; grief ; disease ; ancient.

5. Point out the emphatic words and phrases and tell why you think them emphatic. 10.

Let the candidate read a selection at sight, upon which he shall be marked according to the judgment of the Superintendent, from 1 to 50.

ARITHMETIC.

1. Define Arithmetic as a science ; as an art. 2 pts., 5 each.
2. Define power, square, cube, and index of power. Where is the index written ? 5 pts., 2 each.

3. How many rods of fence will be required to inclose a rectangular tract of land 2 mi. 40 rd. long, and which contains 1096 A ? Proc. 6; ans. 4.

4. A farmer raised $40\frac{1}{2}$ T. of hay. He stacked $13\frac{1}{8}$ T., and put $14\frac{3}{4}$ T. in his barn ; the remainder he sold at \$20.25 per ton. How much did he receive for it ? Proc., 5; ans., 5.

5. How many days and hours will there be in .84 of the year 1880? Proc. 5; ans. 5.

6. How much land at \$35 an acre can an agent buy with \$3126.20, after deducting his commission $1\frac{1}{2}$ per cent. on the amount expended? Proc. 5; ans. 5.

7. The principal is \$19,600, the amount \$21,043.14, and the rate $4\frac{1}{4}$ per cent. What is the time? Proc. 5; ans. 5.

8. The duty on opium is 100 per cent. ad valorem. What is the duty on 125 lb. of opium, invoiced at \$6.87 $\frac{1}{2}$ per pound? Proc. 5; ans. 5.

9. If .1875 bu. of sweet potatoes cost \$.30, what will be the cost of .875 bu.? Proc. 5; ans. 5.

10. Reduce 1428.06 grams to milligrams. Proc. 5; ans. 5.

GRAMMAR.

1. Write a sentence containing *that* used to introduce a noun clause. An adjective clause. 2 pts., 5 each.

2. Give two rules for the use of the period. 2 pts., 5 each.

3. Correct:—*Let each love others better than themselves*, and parse the last word in the corrected sentence. 2 pts., 5 each.

4. Write a sentence containing a *proper* noun, a *common* noun, a *collective* noun, and an *abstract* noun. 3 off for each error.

5. Write four sentences: the first to contain *who* in the second person, plural number; the second, *which* singular number, objective case; the third, *whom*, masculine gender; the fourth, *that*, second person, singular number. 3 off for each error.

6. What class of verbs take the same case after them as before them? 10.

7. What parts of speech have case? Comparison? 2 pts., 5 each.

8. Conjugate the verb *seek*, in the passive, subjunctive, present. 10.

9. Correct:—*This candidate, whom we stated was chosen mayor, was found to be ineligible*, and parse the relative pronoun. 2 pts., 5 each.

10. Parse in the above *mayor* and *ineligible*. 2 pts., 5 each.

GEOGRAPHY.

1. What is the extent, in degrees, of the inclination of the earth's axis? What does this inclination, combined with the annual revolution of the earth, cause? 2 pts., 5 each.
2. Define *latitude* and *longitude*. According to U. States calculation, what point on the globe has neither latitude nor longitude? 3 pts., 4 off for ea. om.
3. What is the difference between a globe and a map? What do figures at the side of a map indicate? 2 pts., 5 ea.
4. Looking at the two hemispheres, what is a noticeable difference between them on the west side? What a similarity on the north? 2 pts., 5 each.
5. What great river system drains the great central plains of the United States? Into what does it drain? 2 pts., 5 ea.
6. In what part of the United States is agriculture chiefly carried on? Why? 2 pts., 5 ea.
7. By what other name is Ireland frequently called? What causes produce the conditions upon which this name depends? 2 pts., 5 ea.
8. What celebrated canal joining the Mediterranean and Red Seas, separates Africa entirely from the north part of the continent? Through what isthmus does it run? 2 pts., 5 ea.
9. Name five great railroad centres of Indiana. 5 pts., 2 ea.
10. Fill the following blanks. 10 pts., 1 ea.

	Coal.	Iron.	Lead.	Silver.	Gold.
State or Territory.					

HISTORY.

1. Why were the aborigines of this country called Indians? 10.
2. (a) When and (b) whence did Columbus sail on his first American voyage, and (c) what American land did he then discover? a=3; b=3; c=4.
3. (a) When and (b) by whom was St. Augustine, Fla., founded? a=3; b=7.
4. (a) Who were the Pilgrims, and (b) whence came they to America? a=7; b=3.
5. What colonies were associated as the "United Colonies of New England," 1643? 10.
6. By what special features was the colonization of Pennsylvania marked? 10.
7. What occasioned the first Congress, 1765? 10.
8. For what did the Congress of 1775 petition the English King? 10.
9. Name three leaders of the Republicans or Democrats, 1789? 10.

10. What were the memorable features of the Battle of New Orleans, 1815? 10.

NOTE.—Descriptions and narratives not to exceed six lines each.

PHYSIOLOGY.

1. How are the bones of the skull united? What is the advantage of this method? 2 pts., 5 ea.
2. What are voluntary muscles? What, involuntary? Name an important one of each class. 4 pts., 3, 3, 2, 2.
3. What changes in the character of the food are required by variations of climate? 10.
4. What is digestion? What is assimilation? 2 pts., 5 each.
5. How is the nutritive portion of the food carried to the tissues? 10.
6. How are the organs of respiration, and their functions affected by tight lacing? 2 pts., 5 ea.
7. What is the office of perspiration? What is the effect of too frequent bathing? 2 pts., 5 ea.
8. Name the three humors of the eye. Why should the eyelids be washed with warm water in the morning? 4 pts., 2, 2, 2, 4.
9. What are the dangers of too prolonged study? 10.
10. Why should we put on extra clothing when we are overheated? 10.

THEORY AND PRACTICE.

1. When would you use the written method of teaching spelling? 20.
2. Give two important directions for ventilating a school-room by windows. 2 pts., 10 each.
3. Which should be first taught, technical grammar or composition? 20.
4. Why should pupils be required to recite in good language? 20.
5. What is a natural punishment for tardiness? Why? 2 pts., 10 each.

ANSWERS TO STATE BOARD QUESTIONS FOR AUGUST, 1880.

IN SPECIAL CHARGE OF ANNIE M. SHERRILL.

The Number of the Answer Corresponds to the Number of the Question.

WRITING.

1. Would use the black-board for bringing before the class the faulty excels noticed in their work during the writing hour, in order that the entire class may observe the error and give directions for correcting it. The attention of the class should be called to the exercise on the board, criticisms be called for, and some one member be called on to correct it or name its fault.
2. *m* is two spaces in width.

3. A straight line, standing at the right of a vertical, forming an angle of 52° with the horizontal gives the main slant. Curves which connect straight lines on small letters are made on an angle of 30° and are called the *Connective Slant*.—*DeGraff's School-Room Guide*.

4. Take the pen between the thumb and first and second fingers and let the holder cross the first finger just forward of the knuckle-joint. The end of the second finger should drop below the first so that the pen may cross it at the root of the nail and the end of the thumb should press upon the holder opposite the first joint of the first finger. The first and second fingers should touch each other as far as the first joint of the first finger; the third and fourth must be slightly curved and separate from the others at the middle joint, and rest upon the paper at the tips of the nails. The wrist must always be elevated a little above the table.—*Spencerian Key to Penmanship*.

ORTHOGRAPHY.

1. The Diphthong is composed of one or two vowels representing always two vowel sounds. The Digraph is composed of two vowels but only one receives a sound, the other being a modifier.

2. (a) Three; (b) Smile, mit, police.

3. It is the general tendency of the language to place the accent on the first syllable of dissyllables, and on the antepenultimate of polysyllables. The exceptions, however, are so numerous that this is not to be regarded as a rule, *but* only as a general tendency of the language.—*Worcester's Dictionary*.

4. Instant, or of the present month; (*Idem*), the same; Infinitive; Justice of The Peace; Manuscripts.

5. Noticeable; Changeable; Debatable; Salable; Peaceable. *Rule*.—Words which end with *e* generally omit it on taking an additional syllable beginning with a vowel. *Exceptions*.—Words ending with *ce* or *ge* retain *e* before the terminations *able* and *ous*, to preserve the soft sound of *c* and *g*.

6. Cylinder; parallel; repealing; sinister; bilious; believe; dying, to lose life; dyeing, to color; billion; gimlet.

READING.

1. Tennyson is still living; was born at Somersby, in England.

2. In the first two lines the bell is commanded to tell something to the sky, clouds, and light. In the third line is stated what the message is to be.

3. The falling inflection at each of these words makes the matter of the stanza more pointed and emphatic.

5. The sentences "Ring out wild bells," and "The year is dying," are most emphatic, because they contain the command and the message, or the leading thoughts of the passage.

ARITHMETIC.

1. Arithmetic as a *Science*, logically investigates and philosophically

classifies and arranges the principles and rules of the subject; as an *Art* it applies the principles and rules for computation to the practical affairs of life.—*French's Com. School.*

2. A *power* of a number is the product arising from using the number a certain number of times as a factor. The *square* of a number is the product arising from using it twice as a factor. The *cube* of a number is the product arising from using it three times as a factor. The *index* is a figure written at the opening of the radical sign which indicates the root to be extracted.

3. 2 mi. 40 rd.=680 rd.=width of field.

$1096 \times 160 = 175360$ = no. sq. rd. in the field.

$175360 + 680 = 257\frac{1}{2}$ = no. rd. in length of field.

$(680 + 257\frac{1}{2}) \times 2 = 1885\frac{1}{2}$ = no. rds. of fence required.

4. $40\frac{1}{2} - (13\frac{1}{2} + 14\frac{1}{2}) = 8\frac{1}{2} - (10\frac{1}{2} + 10\frac{1}{2}) = 1\frac{1}{2} - 1\frac{1}{2} = 12\frac{1}{2}$ = no. T. hay sold.

$\$20.25 \times 12\frac{1}{2} = \$262.16\frac{1}{2}$ = amt. received for hay.

5. .84 of 366 da.=307.44 da.

.44 da. = 10.56 hr.

Therefore, in .84 of the year 1880 there will be 307. da., 10.56 hr.

6. $1\frac{1}{2}$ per cent. of $\$3126.20 = \46.9430 = com.

$\$3126.2000$

46.8930

$\$3079.3070$ = amt. expended = $3079.3070 + 35 = 87.9802$ = no. A. agent can buy.

7. $\$21043.14 - \$19600 = \$1443.14$ = Int. $\$1443.14 + 882.00 = 1.625$ = time in years. .625 yr. = 7 mon. 1.5 da.

Therefore, the time is 16 yr., 4 mo. $11\frac{1}{2}$ da.

8. $\$6.87\frac{1}{2} \times 125 = \$859.42\frac{1}{2}$ = value of entire lot = duty advalorem at 100 per cent.

9. If .1875 bu. cost 30 cts., .0001 bu. will cost $\frac{1}{10000}$ and ten thousand ten-thousandths, or 1 bu. will cost ten thousand times $\frac{1}{10000} = \frac{10000}{10000} = \1.60 . And .875 bu. will cost .875 times $\$1.60 = \1.40 .

10. 1 Gram = 1000 Milligrams.

1428.06 grams = 1428.06 times 1000 milligrams = 1428060.

GRAMMAR.

1. (1). He commanded that all of them should be burned. (2). The deeds that men do will follow them.

2. A period is used at the end of a sentence and as the sign of an abbreviation.

3. Let each love others better than himself.

Himself, pronoun, compound personal, 3d., sing., masc., to agree with its antecedent, the person spoken of. Obj. case, obj. of *love* understood.

4. *George* turned the *flock* into the *field* and was thanked for his *kindness*.

5. (1). Come friends, you *who* were so ready to meet danger in the past, follow me now.

- (2). The house *which* you saw is the school-house.
- (3). The man *whom* we saw was a soldier.
6. Intransitive and passive verbs take the same case after them as before them when both words refer to the same thing.—*Holbrook*.
7. Nouns and Pronouns have *case*. Adjectives have *comparison*.
8. If I be sought.
9. This candidate who we stated was chosen mayor, was found to be ineligible.
- Who, pro., rel. agrees with its ant. candidate in 3d., sing., mas., nom. case, sub. of *was chosen*.
10. Mayor, noun, common, 3d., sing., masc., nom. case in the pred., referring to the same person as the sub., *candidate*. Ineligible is an adj., des. can not be compared, limits *candidate*.

GEOGRAPHY.

1. $23\frac{1}{2}^{\circ}$. The change of seasons.
2. Latitude is distance north or south of the Equator. Longitude is distance east or west of a given meridian. The intersection of the meridian of Washington with the Equator.
3. One is a spherical representation of the earth and the other is a representation on a plain surface. Degrees of Lat. and Long.
4. The difference in contour. One is mountainous on its west side while the other is level. While on the north they are both very irregular in contour.
5. Mississippi. Gulf of Mexico.
6. In the West. Because the soil and climate are most favorable.
7. Emerald Isle. Moisture from the sea and the warmth imparted by the Gulf Stream.
8. Suez Canal running through the Isthmus of Suez.
7. Indianapolis, Ft. Wayne, Terre Haute, Logansport, Vincennes.
- 10.

State or Territory.	Coal. Penn.	Iron. Penn.	Lead. Mo.	Silver. Nev.	Gold. Cal. Col.
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HISTORY.

1. Columbus, believing the island of Guanahani to be a part of the East Indies, named the inhabitants *Indians*.
2. In August, 1492, Columbus left the harbor of Palos, Spain. Sailing westward, he discovered, October, 1492, Guanahani, one of the Bahama Islands. He named it San Salvador.
3. St. Augustine was founded Sept., 1565, by the Spanish, led by Melen-dez.
4. The Pilgrims were a religious sect of people who were distinguished by a stern abhorrence of gaiety and amusement, a profound love of civil and religious liberty, and firmness in adhering to what they conceived to

be the teachings of the Scripture. They came directly from Leyden, Holland.

5. Massachusetts, Plymouth, Connecticut and New Haven were joined, 1643, in a loose confederacy called "The United Colonies of New England."

6. The special features marking the colonization of Pennsylvania were the good feeling existing between the Indians and Quakers, and the prosperity of the colony.

7. The passing of the Stamp Act by the British Parliament was the prime cause that led to the formation of an American Congress.

8. The Congress of 1775 petitioned the English King for a recognition of their rights as English subjects.

9. Jefferson, Madison, and Randolph.

10. The memorable features of the Battle of New Orleans were that it was fought after peace was declared; that the American soldiers were inexperienced, while the British were veterans; and that the loss of the British was great, while that of the Americans was small.

PHYSIOLOGY.

1. By ragged edges called sutures. They interrupt, in a measure, the vibrations produced by external blows and also prevent fractures from extending as far as they otherwise would, in one continued bone.

2. The involuntary muscles are those which aid in the digestion of the food and the absorption and circulation of the nutritive fluids, and are independent of the will. The *voluntary* are those which are subject to the control of the will. The heart is an involuntary muscle. Those of the arm voluntary.

3. The colder the climate the more heat generating should be the character of the food, namely that which contains most carbon, and *vice versa*.

4. Digestion is the process by which food is prepared for the blood. Assimilation is the process by which the prepared food becomes the body.

5. By the circulation of the blood.

6. It compresses the lungs and lessens their capacity.

7. The office of perspiration is to throw off waste matter of the body and to preserve the normal temperature of the body. Too frequent bathing causes too great loss to the body, both of heat and matter through evaporation of the moisture and through keeping the pores open. The former causes *colds*, the latter depletes the system.

8. Aqueous, Vitreous, Crystalline.

9. The increased action of the nerves and blood vessels gives rise to a sensation of fatigue and pain, requiring us to desist which may be relieved by rest, but if we continue to exhaust the brain, it becomes incapable of thought, and consciousness is almost lost in a feeling of utter confusion.

10. To prevent through the rapid evaporation too great a reduction of temperature.

THEORY AND PRACTICE.

1. As soon as pupils can write sufficiently well.
2. Lower windows from the top that heated and impure air may escape avoid cold draughts from raising windows.
3. Composition.
4. That they may learn what is good language and form the habit of using it.
5. The feeling that some thing good and interesting has been missed, and where schools are rightly educated in this matter, the feeling on the part of the pupil that he has done something unpopular, something held in disfavor by both teacher and school both on account of the annoyance to the school, and because of the character which they have been taught such habits indicate.

COLLEGE DEPARTMENT.

DEVOTED TO THE INTERESTS OF THE CENTRAL NORMAL,
DANVILLE, INDIANA.

CONDUCTED BY G. DALLAS LIND.

DEAR FRIENDS: After an absence of two months we again greet you and are happy to state that our prospects are better than ever before. The Central Normal opened Aug. 31 with an increase in attendance of fifty per cent. over any previous corresponding term. At this writing we are two weeks on the road and all departments are literally "booming." The Scientific class is almost double that of any former year and the members are taking hold of their work with enthusiasm. Neither politics nor extremes of weather seem to have any effect on the students. Work is their watch-word and judging by the past experience of pupils we can easily predict that the end of the year will find them possessed of a fund of knowledge and a power of mind which could not be obtained by any ordinary course.

Let us take a glance through the institution and see a part of what we have and what we are doing. At General Exercise we look over the large assembly and see many old faces but many, many more new ones. They will not be strange faces long, however, as Normalites are sociable beings and every body will soon be acquainted with every body else. Our Reunions are always happy affairs and those who do not come in contact with each other in class work here meet and form those pleasant acquaintances which make life sweeter and without which no truly developed soul can exist. Among the old faces we may mention, J. E. Mannix, Florence and Florida Jackman, J. Carey Smith, Nettie Pearson, J. U. Hinshaw, J. D

Finnich, W. T. Lucas, Bessie Patrick, Mable French, G. O. Moore and we will not know where to stop if we commence to mention names.

Prof. Adam's Grammar class though large is managed in such a way that every pupil gets the benefit of every recitation. The Prof. is a master in the art of managing large classes.

The Literature class are busily engaged in the investigation of topics in English History and are taking delight in the beauties of American poets, among which Lowell seems to be the favorite. This class is very large and they take hold of the work with enthusiasm.

The class in German is larger than ever before in the history of the institution. Prof. Spillman proves himself an excellent teacher.

The classes in History, Rhetoric and Geography are enthusiastically pursuing their respective branches under the leadership of Miss Dora Lieuellen. She is a tireless worker.

The vocal music is in charge of Horace Tingley who conducts two large classes successfully. The orchestra under his leadership furnishes us with excellent music each morning at General Exercise.

The experiment tried last year of manufacturing apparatus having proven such a remarkable success it will be continued through the present year. No man is better suited to manage such a department than Dr. Joseph Tingley. Many of our old students are now at work in their respective fields of labor using apparatus which was prepared here and which cost them only the price of the raw material. When you visit this institution you must go through the steam laboratory and see where these wonders are accomplished. The Dr. is ready to give two hours instruction daily without extra cost to students of the Normal. His long and valuable experience in the line of Natural Science and in the manufacture of apparatus will be of great value to any teacher. It is indeed a rare chance for those who wish to make themselves proficient in these important branches. In addition to the regular work in the Laboratory the Doctor will continue his valuable lectures on topics in Natural Science. These lectures are indeed rare treats, given at General Exercise and lasting but ten or fifteen minutes but of such a nature that they attract the undivided attention of his audience. They are accompanied with brilliant experiments which are always such as the pupils themselves may improvise with little or no cost. He is full of practical ideas and teaches how to make and use the simple apparatus which he handles. Our Normal Laboratory is something new in the history of Normal Schools. It is one of the steps in that grand reform which is sweeping over this country and startling the old fogies who occupy too many of the high places in our schools and colleges. The Central Normal claims to be in the front rank in this reform movement. Come and see if it is not. It expects in the future as in the past to stand on its merits, the work which its students do being its best advertisement.

J. W. Fertig will teach at Romney, Ind.; Laomer West at Lafayette, Ind.; J. H. Brown at Fletcher, O.; G. W. Hoenshel at Camargo, Ill.

PUBLISHER'S DEPARTMENT.

SHOW this number of *THE NORMAL TEACHER* to your friends and take their subscriptions.

IN answering advertisements don't fail to say that you saw them in *THE NORMAL TEACHER*.

IT was our intention to notice our exchanges in this number but it has been left over until the next.

OUR readers will find a number of Normal School advertisements in this issue. We can not make special mention of all, but their advertisements speak for themselves.

IN another column will be found the advertisement of the Universal Bath. This bath is all that it is recommended to be. Send to the manufacturer for descriptive circulars.

THE Central Normal College and Commercial Institute, Danville, Ind., opened its fall term with a larger number of students and with brighter prospects than any corresponding term in its history. It will succeed because it deserves success.

IT will pay our readers to notice the announcements of our new works, now in press, G. Walter Dale's new work on Elocution and the Normal Speaker. These works will be brought out as early as possible and will be found to meet the demands of those in need of such literature.

OUR circulation is now 16000 copies monthly—larger than that of any other school journal in the United States and perhaps in the world. We desire to reach 25000 by January 1st and to that end will give a copy of *Easy Experiments in Chemistry and Philosophy* to every one who will send in one new name accompanied by \$1.00 to pay subscription of same.

Now is the best time of the year for agents to sell our books. We have recently added to our list a new series of Normal publications by Prof. R. Heber Holbrook who is now one of the Editors of this journal (see announcement elsewhere). These publications are practical and are sure to become very popular with teachers and students. We shall soon have terms to agents ready on these books and will be glad to send them to all who may desire to canvass for them.

PROF. D. E. SANDERS, Principal of the Kansas Normal College, located at Ft. Scott gave our office a call recently and left an advertisement of his

school which will be found in another column and to which we invite attention. The attendance at the opening of the Fall Term was double that of any previous term. The prospects are good for a large enrollment during the year. It is the only independent Normal in the State. The course of study is practical and adapted to the wants of those preparing themselves to teach.

WE call especial attention to the announcements of the National Normal School to be found in our advertising columns. This school is the oldest independent Normal in the land and is so well known that anything we could say would not add to its prestige or glory. We have been a student in this Institution and caught our first inspiration of Normal enthusiasm and Normal spirit from its founder, Prof. Alfred Holbrook. The school is equipped with every facility that could add to its efficiency and success. It opened its fall term with a large attendance. The Scientific Class alone numbers 103 members. We are glad to hear of the success of the "Grand Old Normal."

THE Readers and Writers Economy Company call attention to their perfected stylographic pen in another column, as this is their first appearance in THE NORMAL TEACHER we give them a short introduction to our readers who will be interested to learn something of the novel enterprise which the company has undertaken. The necessity of accomplishing the best results with the least expenditure of time and labor is felt by all, especially those whose work is at the desk or in the study. The Company is organized for the purpose of seeking out and testing such labor-saving devices as are specially adapted to readers and writers, and such as are found to be of real merit it supplies. The Company has been in operation but little over two years, yet the success it has achieved has astonished its most sanguine friends. We have not space to fully set forth all it offers the public, but advise our readers to send for fuller information to the Chicago address of the Co., No. 69 State St. Circulars &c., are sent free on application.

WE are enabled at the opening of this school year to make a number of important changes in this magazine. In addition to an editorial change as per announcement elsewhere, a Department of Theory and Practice has been established, conducted by Prof. Frank P. Adams, Principal of the Central Normal College. Prof. Adams is too well known to our readers to need any introduction. We are safe in saying that he will make this Department exceedingly valuable. He will discuss not only Methods of Teaching the different branches, but every phase of school government as well. We invite questions for this Department. If you particularly desire methods of teaching certain branches write him for suggestions. If you are having trouble in governing your school or creating an interest in any special class, write him stating particulars and your communication will receive attention through the columns of this journal. You need not give

your name for publication unless you desire, but your name in full with Postoffice address should be given to Prof. Adams that he may know from whom the communication comes.

By reference to announcements elsewhere it will be seen that Prof. R. Heber Holbrook, Associate Principal of the National Normal School, Lebanon, Ohio, has taken the position as one of the Editors of this paper. Prof. Holbrook has been a teacher for many years, was formerly editor of the *National Normal* and is the author of a series of Normal publications. Prof. H. is a vigorous, practical, and crisp writer and will be heard from regularly through the Editorial Notes. The Editorial Notes of this issue are from his pen. Our readers may expect something eminently Normal from one who was "brought up," and who has for years been a teacher in the parent Institution of Normal Schools. Prof. Alfred Holbrook who has probably taught more Grammar and taught Grammar to more persons than any man in the United States, will in this connection furnish our readers each month with an article on that subject which will probably be a transfer of some of his inimitable Grammar recitations to paper. Whatever it may be, we congratulate ourself on being equipped to furnish supplies from the "fountain head," and expect THE NORMAL TEACHER to be more truly Normal than ever before. We feel that strong hands have come to the wheel in the work of spreading Normal principles by putting the Normal School on paper. And while we do not wish to run over any one, we expect to have the most *telling* journal in the land, *up to the times* and *straight to the mark*.

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FROM THE REPORT OF COMMITTEE ON COURSE OF STUDY:

"Your committee being of the opinion that in the matter of durable binding, gradation, completeness, and especially in its features of review lessons, the Revised edition of McGuffey's Series of Readers is much superior to Appleton's, recommend to the Board the introduction of McGuffey's Revised Readers in place of the old series now in use, on the terms contained in the proposition of the publishers."

JAMES P. MAGINN, WM. BOUTON, JOHN J. McCANN, EDW. HUMMELL, JOHN GILWEE.	} Of the Committee on Course of Study.
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At a special meeting of the Board of Education of the city of St. Louis, held Tuesday, Aug. 24th, the above report of the committee on course of study, was accepted, and McGuffey's Revised Readers adopted for the St. Louis public schools by a vote of 18 to 6.

Appleton's Readers were offered at free exchange for two years and declined as a gift, the committee declaring them inferior to McGuffey's Revised.

McGuffey's Revised Readers Adopted for the following Cities and Towns in Indiana:

Terre Haute, Nor. Manchester, Antioch, Mt. Etna, Huntington, Co., Brookston, Bunker Hill, Amboy, Bremen, Perrysville, Eminence, Dublin, Brooklyn, Portland, Worthington, Union City, Brown Co., Valparaiso, Roanoke, Markle, La Gro, Wabash Co., Reynolds, Lincoln, Rochester, Argos, Dana, Monrovia, Raysville, Fort Wayne, Paragon, Centerton, Nashville, Morgan Co., Garrett, Warren, Roan, Goodland, Xenia, Gilead, Bourbon, Rensselaer, Anderson, Warsaw, Princeton, Zionville, Lebanon, Mooresville, Martinsville, Bloomfield, Georgetown, Marshall Co., Sullivan, Boonville, Salem, Connersville, Patrickburg, Eugene, Maxinkuckee, Franklin, Columbus, Petersburg.

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New York City, San Francisco, Columbus, O., Topeka, Burlington, Ia., Brooklyn, N. Y., Sacramento, Cincinnati, Chattanooga, Sandusky, Carbondale, Ill., Dayton, O., Joliet, New Bedford, Mass., St. Louis, Zanesville, O., Dubuque, St. Joseph, Mo., Steubenville, O., Charleston, Ill., Shelbyville, Tenn.,

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VAN ANTWERP, BRAGG & CO., Publishers,
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THE NORMAL TEACHER.

VOL. III. DANVILLE, IND., NOVEMBER, 1880. No. 9.

THE NORMAL SCHOOL QUESTION.

JOHN OGDEN.

It is claimed by some that the High School and College, which are the acknowledged heads of our system of Education, are ample to furnish all the teachers for the Public Schools. But let us see if this claim is well founded, either in fact or in theory.

If the High School can do this work, and do it well, then we have no need to cumber our Educational system with any other institutions; at least, none for the purposes mentioned above.

It is an old adage that "the stream cannot rise higher than the fountain." Indeed, there is always a little waste from friction and other causes. What is true of the fountain is true, in the main, of a school system. There must be a force somewhere outside the ordinary duties of the school-room which shall act as a stimulus and conservator to higher and higher improvements of its members, or the tendencies are either towards routine work or else towards deterioration. There must be something to perpetuate in an improved state, the great Common Schools of our country, or they become either political engines for party purposes, or else the mere makeshifts of the less favored class.

Now if the High Schools or Colleges assume this professional work for teachers they must needs have many changes wrought in their organization and courses of study, for as all pupils do not wish to become teachers, any more than all may wish to become doctors or lawyers, so it would be unwise and unjust to compel all to complete the same professional course. So that, after all, we should have need of separate schools for each and all of these professions; for it were as unreasonable to suppose that the High School would make good teachers without some special contrivances in its organization for that purpose, as to suppose it would make good doctors and lawyers, and tailors and shoemakers.

State Superintendent J. P. Wickersham, of Pa., in speaking of this feature of the Common School system, says: "It must be added that it is universally admitted by those experienced in such matters that Normal Schools are an essential part of every school system. There can be no good schools without good teachers; and there cannot be a body of good teachers without *Normal Schools* in which to prepare them for their work."

Thus speaks one of the ablest educators in America, and in these utterances he only gives expression to the consensual opinions of the teaching profession every where. And in no part of our country is this matter so shamefully neglected and keenly felt as in Ohio. Not, it is true, in her larger towns and cities, where in most cases, ample provisions are made for training her teachers; but in her rural districts, where much the larger part of her children attend school.

Now what is true of the High School, as to its inability to furnish a supply of trained teachers for the schools, is true also of every other grade, from the Primary School to the College and University, provided no special arrangements are added for that special purpose. They have their exclusive work to do, none of which legitimately reaches into the Normal School proper. *It* virtually stands at the head of our national system, as the great conservator of Ed-

educational force, the expounder of Educational law and the type of Educational work and progress.

This is true whether these characteristics appear in an organized form or not. They inhere in the body of leading ideas. The professional ideas are conserved in the acknowledged heads of any profession. This is especially true in regard to teaching. And what is needed most to-day is to give those ideas prominence and potentiality in an institution in which they may be both improved and imparted to the younger members of the profession. But to degrade the Normal School to mere routine work of the ordinary school branches, or to suffer it to go a begging as a private institution is to wrest it from its true sphere and to send it a mere starveling to win a precarious existence amongst the petty strifes and competitions, begotten of cunning and greed.

A true Normal School should be free from all such hindrances. Its objects are consecrated and holy; and the man who would degrade it to a mere money-making machine, or who, for the sake of winning patronage associates it with other professions—a practice too common in these days—deserves the condemnation of all true educators.

Ohio Central Normal School.

HE who is false to present duty breaks a thread in the loom and will see the defect when the weaving of lifetime is unrolled.

GOOD books are to the young mind what the warming sun and the rain of spring are to the seeds which have lain dormant in the frosts of winter.—*Horace Mann.*

KNOWLEDGE is but a small part of education. The more important part consists in the discipline of the mind, the training of the mental powers, the development of the mental faculties and the formation of tastes and habits.—*J. A. Cooper.*

BEAUTIES OF HIGHER ALGEBRAIC EQUATIONS.—NO. III.

ELIAS SCHNEIDER.

In this article I propose to discuss the following equations:

$$x^3 + xy^3 = 820 \quad (1)$$

$$x^2 - y^2 = 9 \quad (2)$$

Let $x^3 + y^3 = z$ and $x^3 - y^3 = v$

By addition $2x^3 = z + v$, and $x = \sqrt[3]{\frac{z+v}{2}}$

By subtracting $2y^3 = z - v$, and $y = \sqrt[3]{\frac{z-v}{2}}$

By factoring (1), we have $xy(x^2 + y^2) =$

Since $x^3 - y^3 = v$, and $x^2 - y^2 = 9$, $v = 9$

By substituting the values of x and y into $xy(x^2 + y^2) =$

820, we have $\sqrt[3]{\frac{z+v}{2}} + \sqrt[3]{\frac{z-v}{2}} \times z = 820$. Now substitute the

value of v , and we have $\sqrt[3]{\frac{z+9}{2}} \times \sqrt[3]{\frac{z-9}{2}} \times z = 820$

By multiplying $z \sqrt[3]{\frac{z^3 - 81}{4}} = 820$

By squaring $\frac{z^4 - 81z^2}{4} = 672400$

Clearing $z^4 - 81z^2 = 2689600$

$$z^2 = \frac{81}{2} \pm \frac{\sqrt{10764961}}{4}$$

$$z^2 = \frac{81}{2} \pm \frac{3281}{2} = 1681 \text{ or } -1600$$

$$z = \pm 41 \text{ or } \pm \sqrt{-1600}$$

But $x = \sqrt[3]{\frac{z+v}{2}} = \sqrt[3]{\frac{41+9}{2}} = \pm 5$ or $\sqrt[3]{\frac{-41+9}{2}} = \pm \sqrt[3]{-16}$

And $y = \sqrt[3]{\frac{z-v}{2}} = \sqrt[3]{\frac{41-9}{2}} = \pm 4$ or $\sqrt[3]{\frac{-41-9}{2}} = \pm \sqrt[3]{-25}$

$$\text{Again } x = \frac{\sqrt{z} + v}{2} = \pm \frac{\sqrt{-1609+9}}{2} \text{ or } \pm \frac{\sqrt{-1600+9}}{2} = \pm$$

$$\frac{\sqrt{4.5 + \sqrt{-400}}}{2} \text{ or } \pm \frac{\sqrt{4.5 - \sqrt{-400}}}{2}$$

$$\text{And } y = \frac{\sqrt{z} - v}{2} = \pm \frac{\sqrt{-1600-9}}{2} \text{ or } \pm \frac{\sqrt{-1609-9}}{2} = \pm$$

$$\frac{\sqrt{-4.5 + \sqrt{-400}}}{2} \text{ or } \pm \frac{\sqrt{-4.5 - \sqrt{-400}}}{2}$$

These equations have therefore 16 roots. That is x has 8 values, and y has 8 values. Four of these values are real; the others are imaginary.

Again, from $x^2 - y^2 = 9$, we have $y = \sqrt{x^2 - 9}$, and $y^2 = x^2 - 9$.

Substituting these values of y and y^2 into $xy (x^2 + y^2) = 820$, we get $x \sqrt{x^2 - 9} (x^2 + x^2 - 9) = 820$. By simplifying and reducing we get $4x^8 - 72x^6 + 405x^4 - 729x^2 - 672400$. Two of the real values of x are $+5$ and -5 . Therefore, dividing the last equation whose roots are eight, as found above, by $(x-5)(x+5)$, we get $4x^6 + 28x^4 + 1105x^2 + 26896$.

This equation is two degrees lower than the preceding one. Let us now use two imaginary roots and depress the last equation also two degrees lower. Divide it by $(x - \sqrt{-16})(x + \sqrt{-16}) = x^2 + 16$, and we get $4x^4 - 36x^2 + 1681$, which is a biquadratic equation which can be solved by the ordinary method.

$$4x^4 - 36x^2 = -1681$$

$$x^2 - 9x^2 = -420.25$$

$$x^2 = 4.5 \pm \sqrt{-420.25 + 20.25}$$

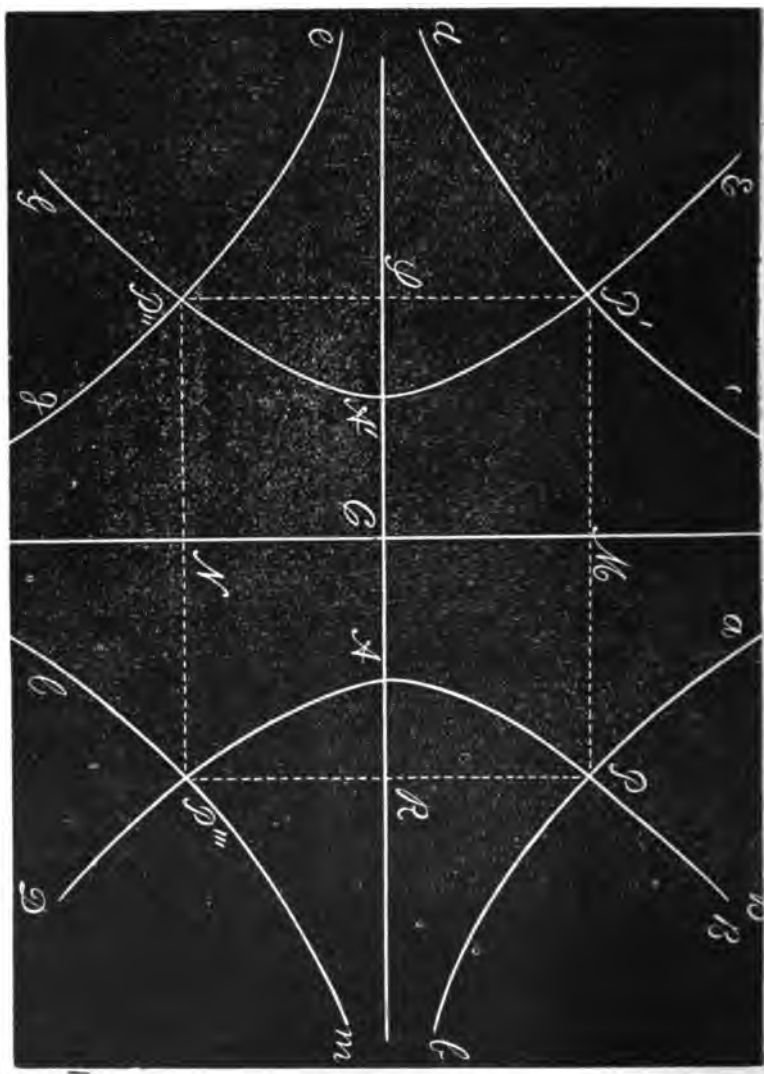
$$x = \pm \sqrt{4.5 \pm \sqrt{-400}}$$

This last expression is equal to what has already been found. Recapitulating we have the following eight values of x and y :

$$x = +5, -5, +\sqrt{-16}, -\sqrt{-16}, +\sqrt{4.5 + \sqrt{-400}}, -\sqrt{4.5 + \sqrt{-400}}, +\sqrt{4.5 - \sqrt{-400}}, -\sqrt{4.5 - \sqrt{-400}}$$

$$y = +4, -4, +\sqrt{-25}, -\sqrt{-25}, +\sqrt{-4.5+\sqrt{-400}}, -\sqrt{-4.5+\sqrt{-400}}, +\sqrt{-4.5-\sqrt{-400}}, -\sqrt{-4.5-\sqrt{-400}}$$

Let us now see how the curves of these equations intersect each other.



The equation $x^2 - y^2 = 9$ is an equation of the hyperbola; and B A D and E A' G are the two arms of this hyperbola. The curves of the equation $x^2y + xy^2 = 820$ are a b, c d, e g, and l m. The points of intersection are P, P', P'', P'''. M P and N P''' are each equal to $+x = +5$; M P, and N P'' to $-x = -5$; R P and L P' to $+y = +4$; L P'', R P''' to $-y = -4$. It has already been remarked that only four of the roots are real. Therefore, only four points of intersection occur. The imaginary roots indicate no intersections. But each root nevertheless satisfies the equations. Let us first try the real roots in each equation.

$x^2 - y^2 = 9$. At the point P, $x = +5$ and $y = +4$. Hence $(+5)^2 - (+4)^2 = 9$. At the point P' $x = -5$ and $y = +4$. Hence $(-5)^2 - (+4)^2 = 9$. At the point P'', $x = -5$ and $y = -4$. Hence $(-5)^2 - (-4)^2 = 9$. At the point P''' $x = +5$ and $y = -4$. Hence $(+5)^2 - (-4)^2 = 9$. Now try $x^2y + xy^2 = 820$. For P $(+5)^2 \times (+4) + (+5) \times (+4)^2 = 500 + 320 = 820$. For P' $(-5)^2 \times (+4) + (-5) \times (+4)^2 = (-500) + (-320) = -820$. For P'' $(-5)^2 \times (-4) + (-5) \times (-4)^2 = 500 + 320 = 820$. For P''' $(+5)^2 \times (-4) + (+5) \times (-4)^2 = (-500) + (-320) = -820$. Both members of an equation being equal to minus, is equivalent to both being positive.

By substituting the imaginary roots in each equation we will find that they verify equally well. But in doing so we must not make the substitution with reference to the points of intersection, as these roots denote no intersection. If all the values of x be annexed to x , with their signs changed, and the product be obtained by the continued multiplication of these expressions, there will result the equation $4x^8 - 72x^6 + 405^4 - 729x^2 - 672400$, as found above. In like manner, if the same thing be done with the values of y , we get an equation of the eighth degree, whose roots are represented by y . The roots found above are *all* the roots the equations contain; they can contain no others. The number of roots in any equation is no more, nor less, than the number of units in the highest exponent of the unknown quantity.

TALKS ON ELOCUTION.—NO. VII.

G. WALTER DALE.

In this Talk I desire to speak of TALENT in Elocutionary work. I must be brief and shall come directly to the discussion. Talent may be resolved into two elements: The basis of a good Voice, and Feeling. We may hardly say, in the strict sense of the term, that the former is a talent, but it is an element necessary to success and I think we may pretty safely call it an *element* of talent. By the basis of a good voice is meant that the foundation must exist upon which the proper attention and skill may rear a splendid voice. Foremost among the requisites looking to this must be found an active, vigorous breathing apparatus. Lungs not necessarily large but healthy. There must be no organic defect nor morbid condition of the vocal organs that produce the sounds of the voice, nor in those that modify them. In this condition of things we have one of the elements of talent in Elocution and the skillful teacher may produce wonderful results as far as this element goes. Sound alone does not fill all the requirements, however, and the best music is not always found in the greatest noise; so if we have never so good a voice built upon the best of foundations, we shall be but sorry elocutionists unless we combine the other element with it. Feeling means much. Ultimately it means the infusion of soul into the expression, but leading to that it may be analyzed into three component parts each pointing to the ultimate meaning. The first of these parts, or steps, is the thorough comprehension of the sense. This involves an analytical study of the subject matter and a thorough insight into the intricacies of its meaning and the motives prompting its utterance. A consideration of the mental conditions necessary to call forth such and such an idea or expression. A vivid mental image of the scene or surrounding contingencies and a keen knowledge of

human nature involving an acquaintance with the influence of different temperamental organizations upon the actions of various individuals.

Then we must throw ourselves in sympathy with the subject thus conceived and see it for the time, from the author's standpoint, actuated by like motives as we have ascribed to him. Herein we get at the vitality of the piece; we extract its essential principle and absorb with a proper adaptation of ourselves to these requirements we will be fitted for giving proper expression to the thoughts of others. The reason why the Elder Booth was so affective in his impersonation of Richard III, was mainly this: That he became for the time the incarnation of his conception—the veritable Richard as he saw him.

It is a great requirement and exacts the most searching study. Much of success lies in the adaptation of ourselves to the conceptions of our minds and to act well or read well, which involves the intellectual part of acting, we must be skillful in this requisite. Very much reading and reciting is done which is about as good a fit, in its place, as one person to wear another's clothes. I ought to add that when feeling becomes emotional it is called Passion and that it consists not in how deeply we feel alone, but how well we can portray it according to the principles discussed in the early part of this Talk. My dear readers, would you learn this art? Study hard then for indeed its requirements are great. The reader—the Elocutionist, has a great deal required of him. When the actor portrays tragedy and comedy well he is regarded as phenomenal, but the Elocutionist must be tragedian, comedian and depicter of pathos else he is a poor stick. Teachers will appreciate this. The specialist in Education is looked to for work in his line, but the Public School teacher, like the Elocutionist compared with other specialists in his line, must be a living cyclopedia of condensed knowledge. Be patient, teachers, if we don't get our pay in this world we'll get it in the next.

CORRESPONDENCE.

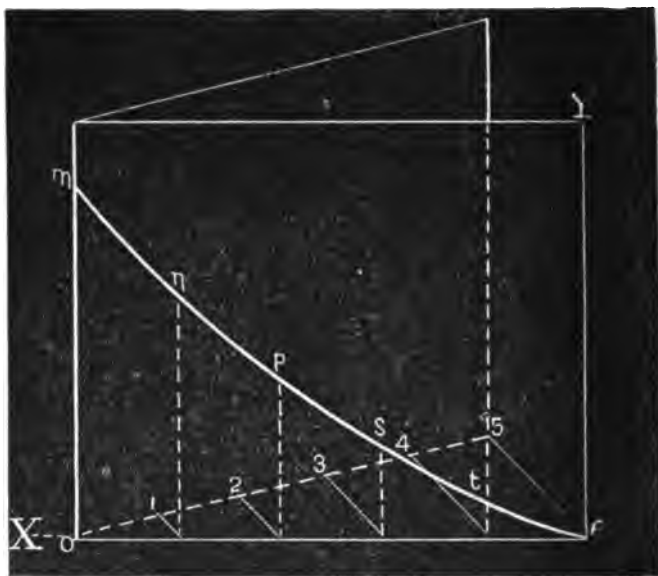
CAPILLARY ATTRACTION.

Editors Normal Teacher:

Works on Natural Philosophy, in treating of Capillary Attraction, almost invariably adduce as an illustration of its effects, the case of two panes of window glass inclined to one another and immersed in a liquid; contenting themselves with the bare statement that the liquid will rise between the panes to different heights by reason of *adhesion*, and that the curve thus formed is a *parabola*.

Doubtless many of your subscribers have been confronted with the embarrassing question, coming from inquisitive pupils, "How is it known that the curve thus described by the liquid is a parabola?"

Permit me to submit the following as fairly within the comprehension of an ordinary Geometry class:



Let $n p s t e$ represent the curve assumed by the liquid. Lay off equal distances along the lines $o 5$ and $o e$.

Now we may conceive that upon $1 a$, $2 b$, $3 c$, etc., lie tubes or cylinders of liquid, contiguous to one another, whose heights, for very manifest reasons, and as a matter of fact besides, are greater as the radii of their bases are smaller.

For it is evident that; between the *same* solid and the *same* liquid the *total effects* of adhesion will be always the same. That is to say that the *amount* of liquid lifted up by adhesion will always be the *same*, the same circumstances of solid, liquid, purity, condition, temperature, state of atmosphere, &c., continuing.

Hence it follows that the volumes of our imaginary cylinders will always be constant. Therefore the heights to which the liquid will rise, namely, na , pb , sc , etc., vary inversely as the squares of the radii of their respective bases, $1a$, $2b$, etc.

Because if V and V' be the volumes of any 2 cylinders, h and h' their heights, r and r' the radii of their bases, then $V = h \pi r^2$ and $V' = h' \pi r'^2$

$$\therefore \frac{V}{V'} = \frac{h \pi r^2}{h' \pi r'^2} : \text{ But since the effect of adhesion is constant, } V = V',$$

$$\text{and we obtain } 1 = \frac{h \pi r^2}{h' \pi r'^2} ; \therefore \frac{h}{h'} = \frac{r'^2}{r^2}$$

$$\text{So that } h : h' :: r'^2 : r^2$$

Arranging this result in conformity with our figure we get

$$na : pb :: (2b)^2 : (1a)^2 ; \text{ etc.}$$

But the triangles $o1a$, $o2b$, etc., being similar by construction, we may substitute oa , ob , oc , etc., in place of $1a$, $2b$, etc., without affecting the proportion.

We have therefore ascertained that the heights or ordinates na , pb , etc., vary as the squares of their respective abscissæ. Formulating this result, taking at the same time the lowermost point e of the curve as origin of coördinates' and generalizing by substituting y for na , and x for ea we get $\frac{y^2}{x} = \text{constant}$, or $y^2 = kx$.

This is obviously the equation of a parabola—a conclusion arrived at by bearing in mind the well known form of the equation of a parabola, or by applying thereto the test given in Salmon's Conic Section for determining the curves represented by equations of the second degree.

For by that test, an equation of the second degree is a parabola whenever the square of the coefficient of $xy = 4$ times the product of the coefficient of x^2 by the coefficient of y^2 .

In the equation $y^2 = kx$

the coefficient B of $xy = 0$

" " A of $x^2 = 0$

" " C of $y^2 = 1$, from which plainly results $B^2 = 4AC$, since $(0)^2 = 4 \times 0 \times 1$, thus indicating a parabola.

St. Louis, Mo.

PAUL PELTIER.

GRAMMAR.

Editors Normal Teacher:

I had determined to have no more to do with the above topic, but can not bear to see my fellow teachers floundering in the bog from which I

think I have escaped. In looking over the August number I saw many things to commend. I like the TEACHER, and wish that more of our teachers would read such periodicals. Very few are taken in this county, the reason commonly assigned being insufficient pay. School boards would not much transcend their powers, while they would greatly benefit their schools by subscribing for three or four like THE NORMAL and let them be read in the school-house. In this county a spirit of caste has grown up between the teachers of the country, and the teachers of graded schools; that I may have something to say about at some future time.

One who becomes a teacher, whether in art or science, thereby exposes himself to criticism, and whether it suit him or not, if he opens his mouth, or takes his pen, he must take the consequences.

The above remark is meant to apply to your correspondent, I. A. Zellers, and as a basis for my criticism I have selected the last sentence in the fourth paragraph of his "Grammar in the Public Schools;" to wit: "But in the construction of sentences many difficulties arise that can not be solved without the knowledge of Grammar, and without that knowledge, no one can, in all cases, construct correct sentences."

Admitting this to be true, let us see how well Mr. Zellers has succeeded in constructing correct sentences; for we must assume that he has this knowledge. He should have known that "difficulties" are *overcome*, not *solved*. "Grammar need not be the dull, uninteresting study as it is claimed to be. It is not, if it is rightly managed by the teacher." Perhaps he can justify, by the rules of grammar, his use of *as*; and the sentence is divided into two, when it should read, "Grammar, if it is rightly managed by the teacher, need not be," etc. In the fourth sentence of the same paragraph he has violated a rule of grammar in sandwiching his adverb between the parts of his infinitive, "to gradually unfold." It should be gradually to unfold or to unfold gradually. The next sentence is no better. "The way it is arranged in most text books tends to make it a dry study if it is followed by the teacher, as it generally is." The mode or manner of its arrangement—if this mode is followed by the teacher. The next sentence ends with "before the pupil can see any benefit of it;" before the pupil can see any benefit in it, or, derive any benefit from it, would be unobjectionable. "They are worried *in* the abstraction, etc.,—from which they acquire a *loathing* and dislike *for* grammar." This is tautology. The greater includes the less. How could one loathe without disliking(?) and how is it possible to "loathe" a study? Also, *for* is incorrectly used. Irving would not have been likely to write the following: "The common mode is an inverted one of the proper mode."

I was once, but am not now, a believer in text-book grammar; so snap my fingers at any one's notion on the subject whether embodied in a text book or not; but am ready to accept truth, coming from what source it may.

On page 228 of the same number of THE NORMAL TEACHER is a very apt illustration of how time may be killed, grammatical definitions ignor-

ed, and common sense defied in the attempt to place English idioms within the straight jacket of grammatical notions. "That, that that that lady parsed, is not that that that she should have parsed." No such sentence was ever heard outside the school-room and if it were heard, the first that is not an adjective as it neither points out nor qualifies, it being impossible for it to do either. The second that is not a noun for it is not a name; the third that is not a relative because a word cannot be its own antecedent, and for a better reason that there is no relative pronoun in English; and the fourth that is not an adjective for the reason that it no more *limits* lady than the first that limits itself. I fear I am trespassing and close.

A. W. CUMINS.

OUTLINE OF AUTHORS.

Editors Normal Teacher:

The ignorance of even the more advanced students of our common schools concerning the authors whose names appear in the readers and newspapers prompted the writing of this outline.

I take here the name of John Greenleaf Whittier and will add other names soon.

1st. John Greenleaf Whittier.

1st. Birth.

1st. Place—Haverhill, Mass.

2nd. Time—Dec. 17, 1807.

2nd. Nativity of parents—American.

3rd. Educated.

1st. Where—Haverhill, Mass.

2nd. Character of School—Private Academy.

4th. Began writing.

1st. Age at first effort—22 years.

2nd. Where—Boston, Mass.

3rd. When—1829.

4th. First published work—Legends of New England.

5th. Occupations.

1st. Editor New England Weekly Review, 1830-38.

2nd. Editor Pennsylvania Freeman, 1838-9.

3rd. Member of the Mass. Legislature, 1835-6.

4th. Associate Editor National Era, 1847.

6th. Works.

1st. Kinds.

1st. Poetry—Short ballads, lyrics, &c.

2nd. Prose—Mainly Editorials, Essays, &c.

2nd. Character—Anti Slavery, Patriotic, &c.

3rd. Extent—His works show great intellectual labor—many short, few long poems.

4th. Names.

- 1⁴. Songs of Labor, and other poems.
- 2⁴. Home ballads and poems.
- 3⁴. National Lyrics.
- 4⁴. Ballads of New England.
- 5⁴. Voices of Freedom, and many others.
- 7². General Information.
 - 1². He never received a classical education.
 - 2². He has always held to the faith of the Society of Friends.
 - 3². As a poet he ranks among those most highly esteemed and honored by his countrymen.
 - 4². He is more peculiarly American than any other of equal fame.
 - 5². Snow Bound, published in 1865, is one of his longest and best poems.
 - 6². The "bachelor poet."

JNO. R. SWAIN.

EDITORIAL NOTES.

EXAMINATIONS.

WHY do they not examine doctors periodically? The preacher's office is more sacred than the teacher's, why is he not given a certificate to preach a certain time and then hauled over the examination coals before he "hires" again. Pilots and engineers when once licensed are supposed to be able to retain sense enough to be pilots and engineers ever after. Why should lawyers not be pursued as with a whip of examination scorpions? They may be incompetents and imposters as well as teachers.

What kind of preachers, doctors, lawyers, engineers, pilots, architects would we have if they were compelled to cram the details of an elementary examination every year or two? Is there a profession in civilization that would stand this outrage and degradation suffered by us? A teacher may have been studying all his life, passing examinations all his life, and yet to get a paltry position as Superintendent or Principal at \$800 to \$1000 a year, he must endure the contemptible inspection called an examination by some local board, whose only qualification to examine him is that they have never taught, or passed an examination in their lives.

It is time for this examination sham to cease. It is time for teachers to rebel. We have some rights that other people are bound to respect.

It may be said we are public officers. So are County Treasurers, Clerks, Recorders, Judges, and *members of School Boards*. Why are they not examined? So are County Examiners. Why are they not examined? Strange that this stream should be made to go higher than its source. If men can be permitted to have their own physician or lawyer, why cannot they be entrusted with having their teacher.

Teachers! we are voters. Education, it seems must needs be a part of politics. Let us assert our rights, claim our freedom and give our votes where they will do us the most good.

INDUSTRIAL EDUCATION.

THE friend of the poor man should oppose Industrial Education. It is the device of aristocrats to keep the plebeians at their proper level. It is a plan whereby the laboring man shall be trained—to labor; that is, to manual labor. It is an arrangement whereby the schools shall be estopped from teaching the common people their possibilities toward a higher and nobler life. It provides that children shall be taught merely the routine and requisites of the manufactories. It will simply be the smoothing out and straightening out of the groove by which the masses shall be surely and safely run into the shops—where they belong, according to the Industrial Educators. It is, or ought to be, well known by all well informed educators that in those nations where education is most industrial, the walls of caste are highest and most impassable. The educational system of Germany, so much lauded by shoddy Americans, is a brutal machine which dooms its children to their own level as inexorably as a dread destiny. Industrial Education is a trick of the envious upper classes to keep back the ambitious lower class talent that continually displaces and surpasses them. "We lawyers, we doctors, we preachers, we teachers are losing our high salaries and comfortable positions by letting this tide of underling upstarts rush up into competition with us. Let the schools keep them back and force them into competition with blacksmiths, machinists and the laboring classes. They can or ought to suffer the misfortunes of skilled competition. We ought not to suffer, and the schools ought to stop this work of preparing the youth of the land for professional or some business pursuits."

The object of the school is not to make machinists any more than it is to make Presbyterians. It is to make men—to stir the loftiest aspiration of which the humblest soul is capable—to point the lowliest plodder to the highest walks in life and say, "You can go there if you will. This school will help you!" Why, when you rob a teacher of the inspiring thought that some one or more of the pupils of his class may become grand and great men, you take from him that which not only crushes his pupils into the death of hopelessness, but makes him a drudge indeed. This Industrial Education will not only blight the masses, but it will doom our profession to a cruel machine life that would drive out of it all but the veriest slaves. Teachers should fight it as they would tyranny. Our soldiers have been the best the world ever knew, because they were educated as men—not soldiers. Our machinists and laboring classes are now more intelligent, more inventive, than those of any civilized nation because they have been educated as *men*, not as laborers. Our nation has made its unparalleled progress because its masses had been educated as *men*, free and

competent to do what their ambition and desires and capabilities suggest. Have we these glorious teachings right before us only to sink into the deathly caste contrivances of continental aristocracies?

HOW TO CONDUCT A READING CLASS.

EVERY reading class is a literature class. It is not an elocution class. To secure good tones and inflections, give the pupils time in reading a passage to comprehend it. Never mind the elocution. Let it take care of itself. By artifice and variety keep the pupils for one week on a passage you have usually read at a lesson. Let the whole interest and study be upon its thoughts and its literary mechanism. Investigate the capitals, the spelling, the punctuation, the paragraphing. Outline it. Instead of reading, let the pupils *tell* it. Be patient here. Do not judge what can be done by the first attempts. Let the pupils stumble and stutter as they will. Don't scold, or disapprove. They are probably doing better than you could. Instead of reading, let the pupils bring their slates, and in five, ten, or fifteen minutes, write what they can remember of the passage. Let them read their own efforts. Don't criticise too closely. Let the elocution go.

NOTES AND QUERIES.

MATHEMATICS.

1. Please demonstrate why a number, the sum of whose digits is divisible by three, can be evenly divided by three. E. H. HINSHAW.

2. Required the length of one side of the largest equilateral triangle that can be measured within a circle 100 ft. in diameter.

WM. W. SMITH, O.

3. A two inch plank will lose in planing $\frac{1}{2}$ inch in width and in thickness, and in solidity 918 cu. in.; but now the plank is three times as long as wide. How wide is it?

GIDEON BIKLER.

$$4. \quad x + y^2 = 7$$

$$x^2 + y = 11. \text{ Find } x \text{ and } y.$$

JESSE THOMPSON.

5. Wanting to determine the quantity of water discharged per minute from a pipe, I place under it a vessel, in the bottom of which is a rectangular aperture which I can close by means of a slide. I find that when the dimensions of the aperture are 4 in. by 3, the water stands steadily in the reservoir at a height of 3 feet. What is the efflux per minute from the pipe, rejecting the effects of contraction.

B. A.

6. By selling at 10% profit I can turn my capital twice a year, but by selling at $6\frac{1}{2}$ per cent. profit, I can turn it three times a year; which is the best way, and by how much per cent., allowing compound interest, and supposing the capital to be reinvested in the one case every six, and in the other every four months?

Id.

7. What number is that which being divided into 4 or 5 equal parts, the product of all the parts in either case will be the same?

MIGNONETTE.

8. Three men, A, B and C, residing at the several corners of a triangle, the sides of which are 65, 70, and 75 chains, agree to build a school-house, the center of which shall be equidistant from the residence of each. What is that distance?

Id.

9. A and B start from the same point and travel in the same direction. A travels 18 mi. a day and travels 9 days, then turns and travels as far back as B had traveled in 9 da., turns again and overtakes B $22\frac{1}{2}$ da. after starting. How far does B travel in one day?

A. WM. VOGT.

GRAMMAR.

1. Diagram and parse italicized words:

The *swan* on still St. Mary's lake,

Float double, *swan* and shadow.—[Wordsworth.

—*Harvey's Grammar*, p. 224.

JOHN E. ORR.

2. Parse italicized words:

I desired *him* to go.

I compelled *him* to go.

ALBON MANSHIK.

4. Parse the italicized words in the following:

I was amused *at* the way *that* he *laughed*.

L. A. REED.

MISCELLANEOUS.

1. What control, if any, should a teacher have over his pupils on their way to and from school?

S. BIXLER.

2. Where is the "Salt Desert?"

J. W. D.

3. How is it that the Cassiquari sends one branch into the Amazon, and one into the Orinoco?

Id.

4. What State pays highest wages per month for teaching in the common schools?

Id.

5. How would you explain long division to new beginners?

MINN.

6. What oral exercise would you give to new beginners in language, and what author?

Id.

7. What period is known as the Hundred Years' War between France and England?

W. E. SMITH.

ANSWERS.

1. [Vol. III, No. 7, Q. 9, p. 261.]

A farmer buys a flock of sheep at the rate of \$35 for every 5 sheep; he afterwards loses 9, and sells the remainder at \$80 for every 11, and the sum for which he sells the flock is \$120 more than that which he gave for it. How many sheep were there?

Solution: Let x =no. of sheep in the flock.

Then, if he sold 5 sheep for \$35, he sold one sheep for $\frac{1}{5}$ of \$35.00=\$7=cost of one sheep.

Also, $\$7x = \text{cost of the flock.}$

And $(x-9) \$\cancel{11}^{\cancel{10}} = \text{cost of flock after losing 9.}$

Also, $\frac{\$80x-720}{11} - \$7x = \$120$ (1)

$80x-720-77x=1320$ (2) clearing eq. (1) of fractions.

$13x=2040$ (3) uniting and transposing.

$3x=2040$ (3)

$x=680$ no. of sheep in the flock.

Proof. $680 @ \$7 = \4760 cost of flock.

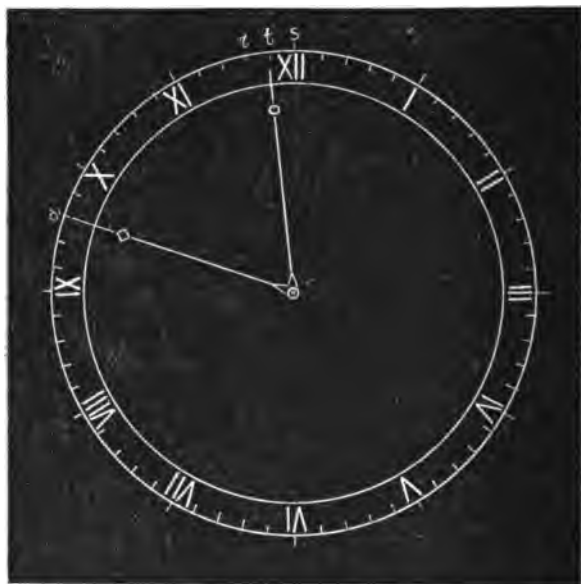
$680-9=671 @ \$\cancel{11}^{\cancel{10}} = \$4880.$

$\$4880 - \$4760 = \$120.$

JOHN W. WILHOIT.

Ex 2. [Vol. III, No. 6, Q. 1, p. 225.]

At what time between 11 and 12 o'clock is the hr. hand half way between XII and the minute hand?



Ans. Let the diagram represent the position of the hands at 12 min. to 12 o'clock. The min. hand passes over 12 min. while the hr. hand passes over one min.—the min. hand traveling 12 times faster than the hr. hand.

If the hr. hand did not move, it would be half way between XII and the min. hand, when the min. hand reached r , or at 2 min. to 12 o'clock. But while the min. hand moves to r , 10 min. spaces from a , the hr. hand, trav-

eling $\frac{1}{12}$ as fast, moves $\frac{1}{12}$ of 10 min. spaces, or $\frac{1}{12} \times \frac{1}{12} = \frac{1}{144}$ of the distance t s, leaving $\frac{1}{12}$ of one min. space for the hr. hand to pass over before reaching s , or 12 o'clock. Now at 2 min. to 12, the hands are $1 + \frac{1}{12} = 1\frac{1}{12}$ min. spaces apart; the *relative* position of the hands remains the same as when the min. hand was at a and the hr. hand at t ; then they were 11 spaces apart; now $1\frac{1}{12} = \frac{13}{12}$ spaces. They will continue thus *relatively* the same distance apart until exactly 12 o'clock, when they will be together. Hence there is *no* time between 11 and 12 o'clock when the hr. hand is half way between XII and the min. hand.

H. A. WITHER.

3. [Vol. III, No. 7, Q. 1, p. 261.]

I think, *for same amount*, is omitted after "cows."Let $100\% = c.$ p. of cheaper. $130\% = s.$ p. of each. $130\% + (100\% \text{ cost} - 50\% \text{ loss}) = 260\% = c.$ p. of higher, on basis of $c.$ of cheaper. $100\% + 260\% = 360\% = \text{sum of costs.}$ $130\% + 130\% = 260\% = \text{sum of s. p.}$ $360\% - 260\% = 100\% = \text{loss.}$ $100\% = \$24. = c.$ of cheaper. $260\% = \$62.40 = c.$ of higher.J. W. DINGLEDINE, *Waverly, O.*

[Problem 1, p. 261.]

Indeterminate. The second cow cannot cost less than \$48, in integral numbers, while the first cow may cost $\frac{1}{4}$ mills.HAMILTON WALLACE, *Supt. Pub. Schools, Canal Dover, O.*

4. [Vol. III, No. 7, Q. 2, p. 261.]

A man has a square yard containing $\frac{1}{16}$ of an acre; he makes a gravel walk around it which occupies $\frac{1}{4}$ of the whole yard. What is the width of the walk?*Sol.* $\frac{1}{16} a = \frac{1}{16}$ of 160 rd. = 10 rd. $\sqrt{16} = 4$ rd. = length of one side of square. $\frac{1}{4}$ of 16 rd. = 4 rd. $16 - 4 = 12$ rd. = area of the square within the walk.Let x = side of square within the walk.Then $x^2 = 12.25$. $\therefore x = 3.5$, by ext. root. $4 - 3.5 = .5$ rd. = twice the width of walk. $.5 + 2 = 2.5$ rd. = $4\frac{1}{2}$ ft. ans.

MIGNONETTE.

5. [Vol. III, No. 7, Q. 3, p. 261.]

What is the side of a cube that contains as many cubic inches as there are square inches in one of its faces?

Let x = side of the cube.Then $x^3 = x^2$.Or $x = 1$, by dividing both sides by x^2 . Ans. 1 inch.*Id.*

6. [Vol. III, No. 7, Q. 4, p. 261.]

Find the least number which is divisible by 9, and when divided by 7 leaves a remainder of 4.

Sol. 9 itself is the least no. divisible by 9. But if 9 be divided by 7, the remainder is 2. If one 9, when divided by 7, gives a remainder of 2, it is evident that two nines or 18 will give a remainder of 4. Ans. 18. *Id.*

7. [Vol. III, No. 3, Q. 2, p. 106.]

How many solid ft. are there in a wedge whose base is 5 ft. 4 in. long and 9 in. wide, the length of the edge being 3 ft. 6 in., and the perpendicular height 2 ft. 4 in.?

Let a =the altitude, b =width of base, m =its length, and n =length of edge.

When the base is longer than the edge, the wedge may be divided into a triangular prism and a quadrangular pyramid.

The solidity of the prism = $\frac{1}{2} abn$; the sol. of the pyramid = $\frac{1}{3} ab(m-n)$; and their sum = $\frac{1}{2} abn + \frac{1}{3} ab(m-n) = \frac{1}{6} ab(3n + 2m - n) = \frac{1}{6} ab(2m + n)$ = sol. of the wedge. If the edge is longer than the base, the sol. of the wedge = the difference between the prism and the pyramid: $\frac{1}{2} abn - \frac{1}{3} ab(n-m)$ = also $\frac{1}{6} ab(2m + n)$.

In this case $\frac{1}{6} (2 \text{ ft. } 4 \text{ in.} \times 9 \text{ in.}) = \frac{1}{6} ab = \frac{1}{6} \text{ ft.}$, and $2 (5 \text{ ft. } 4 \text{ in.}) + (3 \text{ ft. } 6 \text{ in.}) = 2m + n = \frac{25}{4} \text{ ft.}$

\therefore the sol. of the wedge = $\frac{1}{6} \times \frac{25}{4} = 4\frac{1}{4} \text{ cu. ft.}$

Rule: To twice the length of the base add the length of the edge, and multiply the sum by the altitude and width of the base, and take one sixth of the product.

CORNELIUS DILLY.

8. If it takes 64 rails to enclose a field containing 1 square rod, how large would a field be that would contain an acre for each rail in the fence?

Let x = no. of rods in one side of the field.

Then $16x$ = no. of rails in one side.

$64x$ = no. of rails around the field.

$\frac{x^2}{160}$ = no. of acres in the field.

$\therefore \frac{x^2}{160} = 64x$

$\frac{x}{160} = 64$

$x = 64 \times 160 = 10240$. Ans.

W. E. HEAL.

9. [Vol. III, No. 7, Q. 5, p. 261.]

Given b , the base, p , the sum of the squares of the other two sides, and m n the rectangle of the segments.

Let x and y be the segments $\therefore x y = m n$, (1) $(x+y)^2$ = square of the side divided into segments.

$p - (x+y)^2$ = square of the other side.

$\therefore (x+y)^2 - b^2 = p - (x+y)^2$. (2).

Transposing, $2(x+y)^2 = b^2 + p$

Reducing, $(x+y)^2 = \frac{b^2 + p}{2}$

Extracting root, $x+y = \frac{1}{2} \sqrt{2(b^2 + p)}$, hypotenuse, (3).

From (1.) we have $x = \frac{mn}{y}$

Substituting this value in (3) we have after multiplying and reducing,
 $y^2 - \sqrt{2(b^2+p)} = -mn$.

Completing square, extracting root of each member and transposing, we have $y = \frac{1}{2} (\sqrt{2(b^2+p)} \pm \sqrt{2(b^2+p-2mn)})$ and $x =$

$$= \frac{2mn}{(\sqrt{2(b^2+p)} \pm \sqrt{2(b^2+p-2mn)})}$$

$\sqrt{(\frac{1}{2}\sqrt{2(b^2+p)})^2 - b^2} = \frac{1}{2} \sqrt{2(p-b^2)}$, the altitude.

I do not think the statement of this problem sufficiently clear. It is presumable that a right-angled triangle is meant by the proposer, and upon this presumption I have based my solution.

HAMILTON WALLACE, *Supt. Pub. Schools, Canal Dover, O.*

10. [Vol. III, No. 5, Q. 5, p. 187].

If my horse had cost 25% less than 80% of what it did cost, I would have gained in its sale a sum equal to 66 $\frac{2}{3}$ % more than I did gain. What per cent. did I gain?

Let 100% = the cost. 25% less than 80% of the cost = 55% of the cost, or 45 per cent. less than the cost.

66 $\frac{2}{3}$ % per cent. = 45 per cent. of the cost at 55 per cent., or at 45 per cent. less.

\therefore 66 $\frac{2}{3}$ % per cent. + 45 per cent. = 148 $\frac{1}{4}$ % per cent. of the cost at 55 per cent.

148 $\frac{1}{4}$ % - 66 $\frac{2}{3}$ % per cent. = 81 $\frac{1}{4}$ % per cent. of the cost, or of 100 per cent.

100 per cent. - 81 $\frac{1}{4}$ % per cent. = 18 $\frac{3}{4}$ % per cent. of loss.

You would not have *gained* 66 $\frac{2}{3}$ % per cent. more, as you state, but you would have *received* so many per cent. more; again, you should have asked: Did I gain or lose? *ow* many per cent.?

CORNELIUS DILLY.

11. [Vol. III, No. 7, Q. 1, 2, 3 and 4, p. 261.]

This is—what shall we call *it*?

{ [thing] | This
 is { we
 shall call | [to be] what?
 | it

It, pro. obj. sub. of 'to be' understood.

12. It is he, *even he*.

{ It
 is he | he | even

He, pro. nom.; apposition with 'he'; *even*, adj. and limits 'he.'

13. He was not *even* invited *to be* present.

{ He
 was invited { not
 even
 to be present.

To be, v. infin, construction of an adverb and limits 'was invited'; *even* adverb limits 'was invited.'

14. Our island home is *far* beyond the sea.

{ home { Our
 is { island
 { beyond sea | the
 { far.

Far, adv. limits the phrase "beyond the sea."

JOHN W. WILHOIT.

15. [Vol. III, No. 7, Q. 1, p. 261.]

What were the names of the "Seven Wise Men of Greece," and when did they live?

Ans. The Seven Wise Men of Greece are supposed to have lived in the 5th century B. C. Their names were Pittacus, Bias, Solon, Thales, Chilon, Cleobulus, and Periander. Certain strangers from Miletus agreed to buy whatever should be in the nets of some fishermen without seeing it. When the nets were drawn in they were found to contain a golden tripod, which Helen, as she sailed from Troy, is supposed to have thrown there. A dispute arose between the fishermen and the strangers as to whom it belonged, and as they could not agree, they took it to the temple of Apollo, and consulted the priestess as to what should be done with it.

She said it must be given to the wisest man of Greece and it was accordingly sent to Thales who declared that Bias was wiser than he, and sent it to him.

Bias sent it to another and so on until it had passed through the hands of all the men, afterwards distinguished by the "Seven Wise Men," each one claiming that the others were wiser than he was, it was finally sent to the temple of Apollo, where according to some writers it still remains to teach the lesson that the wisest are the most distrustful of their wisdom.

T. A. PUGH.

16. [Vol. II, No. 10, Q. 5 and 6, p. 328].

Who were the "Silver Greys," "The Woolly Heads," and "The Hunkers?"

Ans. Those who believed with Fillmore in Clay's Compromise Measures were called "Silver Greys," and those who followed Seward, "Woolly Heads."

Fillmore was a gray-haired man and, of course, the negroes furnished the second title.

The "Hunkers" were pro-slavery Democrats, and the "Barnburnes" anti-slavery Democrats.

17. Where is "Libby Prison?"

"Libby Prison" is in Richmond, Va.

CHISLEY DANIEL, *Carpenter, Ill.*

NOTES.

Editors Normal Teacher:

Will you please call Mr. Elias Schneider's attention to the fact that his solution of $x^2 + y = 11$; $x + y^2 = 7$ in your May number is not in accordance

with the conditions under which the problem was originally given some years ago?

It was distinctly stated *then* that the problem had to be solved by no *approximate* methods, such as Horner's, but by methods involving the solution of quadratic equations. If he can discover a solution for the remaining three values of (*y*) such as he employed in obtaining one value for *y*, then, and only then, will he have completely solved the problem according to original conditions. I desire to furnish a solution for Mr. J. C. Gregg's.

$$x^2y + xy^2 = 820 \dots (1)$$

$$x^2 - y^2 = 9 \dots (2)$$

Let $x + y = s$, and $x - y = d$

Then from (1), $(x + y)^4 - 3280 = s^4 - 3280 = x^4 + 6x^2y^2 + y^4$.

And $(x - y)^4 + 3280 = d^4 + 3280 = x^4 + 6x^2y^2 + y^4$.

These two equations give $s^4 - d^4 = 6560 \dots (3)$

From (2) $sd = 9 \dots (4)$

Get the value of (*s*) in terms of (*d*) from (4) and substitute in (3)

We thus obtain $d^8 + 6560 d^4 = 6561$

and $d^4 = 1$ or -6561

$\therefore d^2 = \pm 1$ *

and $d = \pm 1$ or $\pm \sqrt{-1}$

Now if $d = \pm 1$, then $s = \pm 9$

Therefore $x = \pm 5$

$y = \pm 4$, all which satisfy original equations.

PAUL PELTIER.

Editors Normal Teacher:

In your issue of May I noticed among your sentences for correction the following: "He should not venture into deep water that can not swim." It was corrected thus: "He who can not swim should not venture into deep water." While I do not think the corrected form of the sentence *grammatically* incorrect, yet I do not understand why *that* should be changed to *who*. Since *that* as a relative is used to represent both *persons* and *things*, I do not think that it (that) could be used to represent a *person* more euphoniously than in the above named sentence.

C. F. MAXWELL, *Watson, Ind.*

"PRAISE where you can, censure where you must; to rich and poor, to high and low, be just."

WEALTH in this world is just so much baggage to be taken care of, but a cultivated brain is easy to carry and is a never-failing source of profit and pleasure.—*Scribner.*

ENERGY will do anything that can be done in the world; and no talents, no circumstances, no opportunities, will make a two-legged animal a man without it.—*Goethe.*

DEPARTMENT OF THEORY AND PRACTICE.

BY F. P. ADAMS, PRINCIPAL CENTRAL NORMAL COLLEGE, DANVILLE, IND.

MY TRAINING CLASS.

ARITHMETIC.—II.

1. If 40 men dig a trench 50 yds. long, 2 ft. wide, 3 ft. deep in 20 days, of 10 hrs. each, how many men will be required to dig one 75 yds. long, 3 ft. wide, 4 ft. deep in 30 da. of 12 hrs. each?

Let us ask a question here for each step in the problem.

(1). If 50 yds. long require 40 men, how many men will 75 yds. long require?

Solution: If 50 yds. long require 40 men, 1 yd. long will require $\frac{1}{50}$ of 40 men which is $\frac{4}{5}$ men. If 1 yd. require $\frac{4}{5}$ men, 75 yds. will require 75 times $\frac{4}{5}$ men, which are $\frac{40 \times 75}{50}$ men.

(2). If 2 ft. wide require 40 men, how many men will 3 ft. wide require?

Solution: If 2 ft. wide require 40 men, 1 ft. wide will require $\frac{1}{2}$ of 40 men, which is 20 men. If 1 ft. wide require 20 men, 3 ft. wide will require 3 times 20 men, which are $\frac{40 \times 3}{2}$ men.

(3). If 3 ft. deep require 40 men, how many men will 4 ft. deep require?

Solution: If 3 ft. deep require 40 men, 1 ft. deep will require $\frac{1}{3}$ of 40 men, which is $\frac{40}{3}$ men. If 1 ft. deep require $\frac{40}{3}$ men, 4 ft. deep will require 4 times $\frac{40}{3}$ men, which are $\frac{40 \times 4}{3}$ men.

(4). If 20 da. require 40 men, how many men will 30 da. require?

Solution: If 20 da. require 40 men, 1 da. will require $\frac{40}{20}$ men, which are 2 men. If 1 da. require 2 men, 30 da. will require 30×2 men, which is $\frac{40 \times 30}{20}$ men.

(5). If 10 hrs. a day require 40 men, how many men will 12 hrs. a day require?

Solution: If 10 hrs. a day require 40 men, 1 hr. a day will require $\frac{40}{10}$ men, which are 4 men. If 1 hr. a day require 4 men, 12 hrs. a day will require 12×4 men, which is $\frac{40 \times 12}{10}$ men.

Now, either of these questions is simple enough in itself, and the solution of each as given is understood. But when we undertake to solve the original problem by proportion or analysis, the pupil becomes confused, and in most cases remains so. Is this confusion, this obscurity, necessary? I think not. Any child of ordinary capacity, can by taking a step at a time thoroughly master compound proportion. I shall proceed to show how this was done practically in the Training Class, first combin-

ing the five solutions above in one solution of several steps by a process known in the Normal circles as Shorter Analysis.

SOLUTION OF PROBLEM, I.—ANALYSIS.

Take 40 men for the base term, because it is of the kind required in the answer. If 50 yds. long require 40 men, 1 yd. long will require less; hence divide by 50. If 2 ft. wide require 40 men, 1 ft. will require less; hence, divide by 2. If 3 ft. deep require 40 men, 1 ft. deep will require less; hence divide by 3. If 20 da. require 40 men, 1 da. will require more; hence multiply by 20. If 10 hrs. a da. require 40 men, 1 hr. a da. will require more; hence, multiply by 10.

This compound fraction— $\frac{40m. \times 20 \times 10}{2 \times 3}$ —expresses the number of men required to dig a trench 1 yd. long, 1 ft. wide, and 1 ft. deep, in 1 da. of 1 hr. per da.

SYNTHESIS.

If 1 yd. long require the number of men expressed by this fraction, 75 yds. long will require more; hence, multiply by 75. If 1 ft. wide require the number of men expressed by this fraction, 3 ft. wide will require more; hence, multiply by 3. If 1 ft. deep require the number of men expressed by this fraction, 4 ft. deep will require more; hence, multiply by 4. If 1 da. require the number of men expressed by this fraction, 30 da. will require less; hence, divide by 30. If 1 hr. a da. require the number of men expressed by this fraction, 12 hrs. a day will require less; hence, divide by 12. The result of this work gives the following fraction:

$$\frac{40m. \times 20 \times 10 \times 75 \times 3 \times 4}{50 \times 2 \times 3 \times 30 \times 12} = 66\frac{2}{3} \text{ men.}$$

The pupil or teacher in using this method should draw a horizontal line and place above it at the left end the base term. The numbers by which we divide should be placed below the line and those by which we multiply should be placed above the line. All the reasonings should be to the base term—never from it. Never begin with the base term, but begin with the others and come to the base term. Thus in the example given, in which 40m. is the base term, do not say "if 40 men dig 50 yds, 1 yd," &c. But say rather, "if 50 yds. require 40 men, 1 yd. will require," &c. An observance of this last suggestion will obviate much obscurity.

Having solved a number of problems by analysis, and having discussed the methods of presenting the same to classes in this study we next applied the same principles to compound proportion.

It must not be considered that the above solution is by proportion. It is only analysis. But the pupil having mastered the method of Shorter Analysis is in a fair way to understand proportion.

Proportion is an equality of ratios. In every proportion there are four terms, two means and two extremes. From the fact that the product of

the means is equal to the product of the extremes it follows that having any three terms, two means and an extreme, or one mean and two extremes we can find the other term. Thus, $4:8::7:x$.

$$\begin{array}{r} 4x=8 \times 7 \\ \quad 8 \times 7 \\ \hline x = \end{array}$$

4

That is, the unknown extreme is equal to the quotient arising from dividing the product of the means by the known extreme. Then it must be evident that we can take the second mean as a multiplicand, the first mean as a multiplier, and the first extreme, or first term, as the divisor.

Now, since the second term, (or first mean), is the *multiplier*, and the first term is the divisor, what will be the result if the second term is *greater* than the first? *Ans.* The answer or result will be made less than the multiplicand or third term. What will be the result if the second term is *less* than the first? *Ans.* The result must be less than the third term. Then if from the nature of the problem the answer ought to be less than the third term, how should the other two terms be arranged? *Ans.* Place the less for the second, and the greater for the first, because a number will become greater if we multiply by a less number than the number by which we divide.

Problem in Simple Proportion: 5 bu. of pears cost \$8, what will 15 bu. cost? Take \$8 for the third term because it is of the kind required in the answer.

If 5 bu. cost \$8, 15 bu. will cost more than \$8; hence, place 15 the greater of the two numbers, for the second term and 5, the less, for the first.

This gives the following proportion:

$$\begin{array}{l} \text{bu.} \quad \text{bu.} \quad \$ \quad \$ \quad \$ \\ 5 : 15 :: 8 : x = .24 \end{array}$$

Now, it is very plain when I say that if 5 bu. cost \$8, 15 bu. will cost more and that since the second term is the multiplier and I desire the answer to be greater I place the greater of the two numbers for the second term or multiplier; but how about compound proportion? Can it be explained thus? Exactly. Compound proportion is but a compounding of simple proportions, each of which may be taken separately.

A single example will serve for illustration:

If 4 men in 8 days cut 48 cords of wood, how many cords will 5 men cut in 6 days?

Place 48 cords for the third term, because it is of the kind required in the answer. If 4 men cut 48 cords, 5 men will cut more; hence place 5 men, the greater, for the second term, and 4 men, the less, for the first. If 8 days give a result of 48 cords, 6 days will give less; hence, place 6 days, the less, for the second term, and 8 days, the greater, for the first.

$$\begin{array}{l} 4 \text{ men} : 5 \text{ men} \\ 8 \text{ da.} : 6 \text{ da.} \end{array} \} :: 48 \text{ cords} : x = 45 \text{ cords.}$$

GRAMMAR DEPARTMENT.

TEST WORDS IN SYNTAX.

BY A. HOLBROOK, PRINCIPAL OF NATIONAL NORMAL SCHOOL, LEBANON, O.

Below we give some test examples in Syntax. They will prove interesting nuts to crack with Harvey's or Swinton's Grammar. We think it well to give our hammering young readers a month to work at them. If industrious, they will get the meat out of them, no doubt.

1. When buttress and buttress alternately
Seemed (1) *framed* of ebony and of ivory,
Where distant Tweed is heard (2) *to rave*.—*Scott*.
2. (3) *Scared*, at thy frown terrified, fly
Self pleasing folly's idle brood,
And leave us leisure (4) *to be* (5) *men*.—*Gray*.
3. (6) *To be* no more; sad (7) *curse*;
For who would lose this intellectual being?—*Young*.
4. He ordered his helpless (8) *victim* (9) *brought* before him.—*Translation of Cicero, vs. Verres*.
5. (10) *Drest* in a little brief authority
Most ignorant of (11) *what* he's most (12) *assured*,
Plays such fantastic tricks before high heaven,
(13) *As make* (14) *angels* (15) *weep*.—*Shakespeare*.
6. He ignores the fact which he was most anxious (16) *to have considered*.
7. Had (17) *it* not been for Dryden, we never should have had a Pope.
—*Goldsmith*.
8. (18) *It* seems as if we Britons were ordained
To fear each (19) [*person*] other, (20) [*person*] fearing none beside;
In other eyes our talents rarely (21) *shown*,
Become at length so splendid in our own,
We dare not risk them unto public view
Lest they miscarry of (22) *what* seems their due.—*Cowper*.

You cannot dream yourself into a character. You must hammer and forge yourself one.

THE wealth of a man is the number of things he loves and blesses, which he is loved and blessed by.—*Carlyle*.

WHERE diligence opens the door of the understanding and impartiality keeps it open, truth is sure to find an entrance.

EXAMINATION DEPARTMENT.

QUESTIONS PREPARED BY THE INDIANA STATE BOARD OF EDUCATION, FOR THE EXAMINATION OF TEACHERS IN SEPTEMBER, 1880.

WRITING.

1. At what age or in what grade should children begin to learn to write?
Why? 2 pts., 5 each.
2. Give a general classification of the small letters. 10.
3. Explain the form and proportions of the capital *O*. 10.
4. Analyze the figure four (4). 10.
5. What is a compound curve or wave line, and mention several letters containing it. 2 pts., 5 each.

Write this couplet as a specimen of your writing:—

"A form more fair, a face more sweet,
Ne'er hath it been my lot to meet."

Let the penmanship of the candidate as shown in the answers to the above questions be marked from 1 to 50 according to the judgment of the Superintendent.

SPELLING.

1. What six different letters or combinations of letters are used to represent the sound of long *o*? 10.
2. Indicate by use of diacritical marks the sounds of the letters in the following words:— 10.
Word, couplet, houses, again.
3. Mention three different methods that may be used for correcting the misspelled words when the spelling lesson is written. 10.
4. Spell 20 words pronounced by the examiner. 70.

READING.

1. Describe the word method of teaching primary reading. 10.
2. What is the purpose the teacher should have in teaching primary reading, as distinguished from his purpose in teaching advanced reading? 10.
3. Write a series of questions that might be placed on the black-board to aid the pupil in making a thought-analysis of the following paragraphs:

1. "Fanny and Harry and little May all went with their papa to see the balloon. At first they felt afraid of it; but after they had seen several persons get into the pretty basket car and ride high up above the houses, and had seen them drawn safely down again by the rope which held the balloon, they were no longer afraid, but wished to have a ride too.

2. The father helped them into the basket; first Fanny, who was nine years old; then Harry, who was six; and last, little May, who was not quite sure that she was not afraid." 10

4. Give reasons for the use of the different marks of punctuation in the last paragraph? 10

5. What should be the inflection of the voice in each of these marks in the last paragraph. 10.

6. The applicant should read orally a selection made by the examiner upon which he may receive from 1 to 50 per cent.

ARITHMETIC.

1. What is the shortest length of rope which can be cut exactly into pieces either 15, 18, 20, or 21 feet long? Proc., 5; Ans. 5.

2. $(\$4.37\frac{1}{2} - \$1.47\frac{3}{4}) \times (\frac{3}{8} + .63)$ —what? 10 or 0.

3. Divide $\frac{7}{8}$ by $\frac{1}{2}$, by analysis. Anal., 5; Ans., 5.

4. Reduce .45 pk. to the decimal of $1\frac{1}{4}$ bushels. Proc., 5; Ans., 5.

5. One meter is 39.37 inches in length. What is the length in feet of 5 myriameters? Proc., 5; Ans., 5.

6. If 16 men build 18 rods of fence in 12 days, in how many days can 96 men build 72 rods? By analysis. Anal., 5; Ans., 5.

7. What principal put at interest at 4 per cent. per annum will amount to \$182.20, in 5 yrs., 4 mos. 12 da.? Proc., 5; Ans. 5.

8. A capitalist invests \$20500 in U. S. 10-40's, which pay 5 per cent. interest in gold, at $2\frac{1}{2}$ per cent. premium. If gold is worth 135, what per cent. in currency does he receive upon his investment? Proc., 5; Ans., 5.

9. The slant height of a pyramid is 11 inches and the base is 4 inches square. How many square inches in the entire surface? Proc., 5; Ans., 5.

10. A man bought a rectangular farm 140 rd. long and 40 rd. wide, at \$40 an acre. What did it cost?

Process.—140 rd. \times 40 rd.—5600 sq. rd. \div 160—35a \times 40—\$1500.

State 4 points in which the above process is incorrect. Write the work correctly. 5 pts., 2 each.

GRAMMAR.

1. Correct: There were many drew back from there promises. 10.

2. Punctuate: the italians say good company in a journey makes the way seem shorter. 10.

3. What would I give if I could see you happy. Parse *you* and *happy*. 2 pts., 5 each.

4. Analyze the above sentence. 10.

5. Conjugate the verb *lose*, in the present, potential, passive. 10.

6. Decline *she*. 10.

7. Write a sentence containing a verb which has a sentence for its object. 10.

8. Up, comrades, up—

In Rokeby's Halls

Ne'er be it said our courage falls.

Parse *up* and *said*.

2 pts., 5 each.

9. I do not know where he is. Parse *know* and *where*.

10.

10. Correct: The molasses are excellent. Each strove to recover their position.

2 pts., 5 each.

GEOGRAPHY.

1. Why, when it is summer in the northern hemisphere, is it winter in the southern? 10.

2. When it is noon at New York it is 6 o'clock A. M. at another place; is this place east or west of New York? Why? 2 pts., 5 each.

3. Why is S. America so rank in vegetation, and Africa so largely covered by deserts? 10.

4. Into what departments is the government of the United States divided? In whom are the various functions vested? 2 pts., 5 each.

5. What is the general character of the surface of the far western States and Territories? For what are these districts valuable? 2 pts., 5 each.

6. Which is the largest New England State? Which the smallest? Which the most important? 3 pts., 4 off for each one.

7. Name three important manufacturing cities in the United States and two in England.

5 pts., 2 each.

8. What is the most densely populated country of Europe? 10.

9. What country owns the middle peninsula of southern Asia? For what is Lucknow celebrated? 2 pts., 5 each.

10. Name the capitals and chief commercial cities of England, United States, Scotland, Portugal, and Cuba. 10 pts., 1 each.

HISTORY.

1. What is the relation of physical geography to history? 10.

2. What was President Van Buren's policy respecting the relation between the U. S. Government and the banks? 10.

3. Give an estimate of the political character of John Tyler. 10.

4. (a) In what year was Florida admitted to the Union? (b) How many States then in the Union?

5. What led to the Mexican war, 1846-'48? 10.

6. What was the chief event of Fillmore's administration? 10.

7. Tell the story of John Brown at Harper's Ferry, 1859. 10.

8. (a) What State first seceded from the Union? (b) In what year? a, 6; b, 4.

9. (a) Who was President of the Southern Confederacy? (b) What was his previous public career? a, 2; b, 8.

10. What faculties in your pupils do you seek to cultivate by the study of history? 10.

NOTE.—Descriptions and narratives not to exceed six lines each.

PHYSIOLOGY.

1. What two advantages result from the peculiar constitution of the bones in early life? 2 pts., 5 each.
2. Name three beneficial effects of exercise. 3 pts., 4 off for each one.
3. What persons require the most sleep, those who labor with the hands or those who labor with the brain? Why? 2 pts., 5 each.
4. Boerhaave said, "We should put off our winter clothing on midsummer's day, and put it on again the day after." What did he mean by this? 10.
5. What is meant by the term "food?" From what source do we, directly or indirectly, derive all our articles of food? 2 pts., 5 each.
6. What is insalivation? What three important ends does it effect? 4 pts., 3 off for each one.
7. How many circulations are there in the human system? What is the office of each. 4 pts., 3 off for each one.
8. How can you breathe the impure air of a sick room with comparative safety? 10.
9. Would you advise the presence of flowers and plants in the school-room? Why? 2 pts., 5 each.
10. What are the uses of pain? 10.

THEORY AND PRACTICE.

Write a page or more on the recitation, stating its objects, the different methods of testing, the advantages of each, the characteristics of a good question, the errors to be avoided, etc.

NOTE.—The paper written by the applicant should be marked on a scale of 1 to 100. The number, value and correctness of the statements made should be considered.

ANSWERS TO STATE BOARD QUESTIONS FOR SEPTEMBER, 1880.

IN SPECIAL CHARGE OF ANNIE M. SHERRILL.

The Number of the Answer Corresponds to the Number of the Question.

WRITING.

1. Writing is the complement of Drawing, and both these are the complement of reading. In our best schools pupils are taught to write the first year.—*DeGraff's School-Room Guide.*
2. As to form the short letters may be divided into thirteen short, four semi-extended, and nine extended or looped.—*Id.*
3. The capital *O* is an oval letter made on the regular slant, and contains a left curve, right curve, and left curve. The second and third curves should be equal. The distance between the left curves should be one-fifth

of the letter. The capital *O* is three spaces high, and its width two-thirds its length.—*Hand-Book of Penmanship.*

4. The figure 4 contains a right curve, horizontal left curve, and left curve. The first begins one-fourth of a space above the head line, and extends three-fourths of a space below it, where it is joined at a point to the horizontal left curve one and one-half spaces long. The last left curve is made on the regular slant, one and one-half spaces high and three-fourths of a space from the right curve.

5. A compound curve is a combination of right and left curves. The letters *D, Q, V, F, S, T, L, A, P, B, R, K, N, M*, contain the compound curve.

SPELLING.

1. The following different combinations of letters are used to represent the sound of long *O*: *au, eo, ew, oa, œ, oo, ou, ow, o-e, eau, owe, o-ue.*

3. Inspection of slates by teacher. Inspection of slates by monitors appointed by teacher. Having pupils inspect and correct each other's slates. Having children compare slates with the lesson in the book, or written on the black-board; a plan which has the advantages of throwing the labor on the child and of having the corrections made at the same time, all that is needed being a vigilant oversight, to see that it is faithfully done. But the method which to our mind is best is to dictate but one or two sentences, and then to have each sentence spelled through by the teacher, or by the scholars in turn, every mistake being underlined.—*DeGraff.*

READING.

1. The word method begins with words, and not letters. It teaches words as representations of things, qualities, or actions without any reference to the fact that the words are made up of letters. To this end real objects are presented to the pupils, an interest in the object is created by question and conversation, and while this interest burns, the *word* representing the object, quality or whatever is under discussion is placed before them and they are made to feel that the word is a picture of the thing, quality, or action. They are required to drill in pronouncing the word until the picture and pronunciation are inseparably impressed on the mind.

2. Methods of teaching reading are modified by the capacity of the pupils. Those passing from the spelling and pronouncing of words to reading, and until they are able to commit to memory and comprehend the simple rules of elocution, must be instructed orally. This is called the *First Stage*. The activity of Sense and Memory in childhood makes of children quick imitators. They, with little effort, almost exactly reproduce whatever impresses them forcibly, either in action or speech. By cultivation of this power they soon acquire skill in reading, and are thus prepared to enter upon the *Second Stage* of learning to read. They may thus learn and observe certain simple and practical rules of pitch, force, time and inflection, and give attention to the cultivation of expression.—*Sypher's Art of Teaching School.*

3. (1) Who composed the party that went to see the balloon?
 (2) How did they feel on seeing the balloon?
 (3) What did they do before they returned home?
 (4) Why were they no longer afraid of the balloon?
 (5) How did they get into the basket?
 (6) In what order were they helped into the basket?
4. The semicolons separate the parts of the connected compound sentence, while the commas mark the sub-divisions.
5. Falling at the first and the rising at each of the others except the last.

ARITHMETIC.

1. 3) 15, 18, 20, 21.
 2) 5, 6, 20, 7.
 5) 5, 3, 10, 7.
 1, 3, 2, 7.
 $7 \times 2 \times 3 \times 5 \times 2 \times 3 = 1260$ ft.
2. \$2.91 $\frac{1}{10}$.
3. Analysis.— $\frac{7}{8}$ divided by *one* equals $\frac{7}{8}$, hence $\frac{7}{8}$ divided by $\frac{1}{4}$ equals 6 times $\frac{7}{8}$, and $\frac{7}{8}$ divided by 5 sixths equals $\frac{1}{5}$ of 6 times $\frac{7}{8}$, which is $\frac{3}{4}$ times $\frac{7}{8}$, which equals $\frac{21}{32}$, or $\frac{3}{8}$.
4. $1\frac{1}{4}$ bu.—5 pk.
 .45 pk.+5—.09 pk.
 .09 pk.+4—.0225 bu.
5. One myriameter is equal to 10000 meters and 5 myriameters would be equal to 50000 meters; if one meter is 39.37 inches, 50000 meters would be 50000 times 39.37 inches—1968500 inches—164041 $\frac{3}{4}$ ft.
6. If 16 men can build 18 rds. of fence in 12 da., to do the work one man will require 16 times 12 da. which are 192 da., and 96 men will require $\frac{1}{96}$ of 192 da., which are 2 da. If 96 men can build 18 rds. of fence in 2 da., to build one rd. they will require $\frac{1}{18}$ of 2 da., which is $\frac{1}{9}$ da. And to build 72 rds. will require 72 times $\frac{1}{9}$ da. which are 8 da. Therefore, if 16 men build 18 rds. of fence in 12 da., 96 men can build 72 rds. in 8 da.
7. \$.04—int. on \$1 at given rate for 1 yr.
 .20— " " " " " 5 yrs.
 01.333 " " " " " 4 mon.
 .133 " " " " " 12 da.
 \$.21,466—total int.
 1.00
 \$1.21,466—amt. of \$1 for given time.
 \$182.20+1.21466—\$150.—prin. required.
8. Since the bonds are at 2 $\frac{1}{2}$ per cent. premium, \$1 in bonds is worth \$1.025 in currency.
 If \$1.025 in cur. equal \$1 in bonds \$20500, the currency to be invested,

equal as many dollars in bonds as \$1.025 is contained times in \$20500, which are 20000 times. Hence, the face of the bonds is \$20000.

5 per cent. of \$20000—\$1000, the gold interest.

Since \$1 in gold is worth \$1.35 in currency, \$1000 in gold are worth 1000 times \$1.35, which are \$1350, the currency interest.

Then \$1350 is what per cent. of \$20500.

1 per cent. of \$20500—\$205.

If 1 per cent. of \$20500 is \$205, \$1350 are as many per cent. as \$205 are contained times in \$1350, which are $6\frac{1}{2}$ times. Hence, the rate of interest on investment is $6\frac{1}{2}$ per cent.

9. 16 in.—boundary of base. $4\frac{1}{2}$ in.—half slant height. 16 sq. in.—area of base.

$16 \times 5\frac{1}{2} + 16 = 104$ —no. sq. in. in entire surface.

10. (1) In statement, being illogical in arrangement.

(2) In the use of a small *a* as the sign of *acres*.

(3) In the attempt to multiply rds., by rds.

(4) In the result.

140 rd. \times 40—5600 sq. rd.

5600 sq. rd. $+ 160 = 35$ A.

$\$40 \times 35 = \1400 .

GEOGRAPHY.

1. Because by the inclination of the axis of the earth, the sun shines one part of the year directly on the northern hemisphere and the other part of the year directly on the southern hemisphere. When the earth is in that part of its orbit in which the sun shines directly north of the equator it is summer in the northern hemisphere, and winter in the southern, and when it is in that part of its orbit when the sun shines directly on the south side of the equator, it is summer in the southern hemisphere and winter in the northern.

2. West. Because the sun appears to travel from east to west and when it is noon at New York it has not yet arrived at a place west of New York consequently the time at that place is before noon.

3. South America receives a greater rain fall than Africa, consequently its vegetation is greater.

4. The U. S. government is divided into three departments, the Executive, vested in a President; the Legislative, vested in a Congress consisting of a Senate and House of Representatives; and the Judicial, vested in a Chief Justice and nine associate Justices, constituting the Supreme Court.

5. The surface of the far western States and Territories is generally mountainous or consisting of elevated plateaus dry and nearly destitute of vegetation. These districts are valuable chiefly for their mineral wealth.

6. Maine is the largest New England state, and Rhode Island is the smallest. Massachusetts is the most important.

7. Lowell, Mass., New Haven, Conn., and Pittsburg, Pa., in U. S. Manchester and Sheffield in England.

8. Belgium.
9. Hindostan belongs to Great Britain. Lucknow is celebrated as being the scene of the heroic defense by a British garrison against an overwhelming force in the mutiny of 1857.
10. England, London. United States, Washington and New York, Scotland, Edinburgh and Glasgow. Portugal, Lisbon. Cuba, Havana.

HISTORY.

1. The physical features of the earth have determined to a great extent the character and distribution of the population. Nations have maintained their existence and peculiar character by reason of the physical nature of their location. As an instance we may mention the Swiss people, who have maintained their independence and a Republican form of government in spite of the contending powers around them, because they are hemmed in and protected by mountains.

2. Van Buren's policy was exhibited in what was known as the Sub-Treasury bill, providing that all government dues should be paid in gold or silver and that the public funds were to be taken from the state banks and deposited with sub-treasurers appointed for the purpose, who were to give security for the proper discharge of their duties.

3. John Tyler was a man of considerable ability and had been placed on the Whig ticket through motives of expediency, although he was known to be opposed to a U. S. bank. On his accession to office he disappointed the party that had elected him by vetoing the bill to recharter the U. S. Bank. By the act of elevating this man to the office of Vice President, the Whig party virtually gave itself into the hands of its enemies. The lesson to be learned from this and subsequent similar cases should be that political parties should never, through motives of expediency, place men on their ticket who are not entirely in accord with the principles of the party.

4. Florida was admitted in 1845 as the 27th State.

5. The passage of the resolutions permitting Texas to join the Union was considered by the Mexicans as an act of hostility. Moreover, the western boundary of Texas was in dispute. The Texans claimed the country as far as the Rio Grande, while, on the other hand, the Mexicans contended that the revolted province had never spread farther westward than the river Neucenes.—*Hist. of U. S., Campbell.*

6. The passage of the Omnibus Bill.

7. John Brown, an old man who had taken part in the border warfare in Kansas, conceived the idea of inciting an insurrection among the slaves, and thus setting them at liberty. With twenty one followers he made an attack on the arsenal at Harper's Ferry and seized the arms intending to place them in the hands of the slaves. He was overpowered by the state militia and many of his followers killed. He was hung for murder and treason.

8. South Carolina was the first state to secede. In the year 1860.

9. Jefferson Davis. He was born in Kentucky, 1808, educated at West Point, served in Black Hawk and Mexican Wars, was a member of House of Representatives, U. S. Senator and Secretary of War under Pres. Pierce.
10. 1. Memory of events. 2. Power of discrimination and comparison.
3. The moral faculties in general.

GRAMMAR.

1. There were many who drew back from their promises.
2. The Italians say, "Good company, in a journey, makes the way seem shorter."
3. You, *pro.*, personal, *ant.* person spoken to, with which it agrees in 2nd person, gender and number unknown. Objective subject of the *infin. to be*, understood. *Happy*, an *adj. des.*, limits *you*.
4. What would I give if I could see you happy, is a complex declarative sentence of which *I* is the simple subject unmodified, and *would give what if I could see you happy*, is the complex pred., of which *would give* is the simple pred., modified by *what*, a simple *obj. element* of the first class, and by *if I could see you happy*, a simple *adverbial element* of the third class and also a simple subordinate declarative sentence of which *I* is the simple subject unmodified, and could see you [to be] happy is the complex pred., of which *could see* is the simple pred., modified by *you* [to be] happy, a complex *obj. element* of second class. *You*, the objective subject of *to be*, is modified by *happy*, a simple *adj. element* of the first class.
5. May, can, or must be lost.
6. Nom., *she*, poss. her, obj. her.
7. I know that you are mistaken.
8. *Up*, verb, irreg., intrans., act., imperative mode, 2nd, plural, to agree with sub., *comrades*. *Said*, verb, irreg., trans., active, prin. parts, say, said, said, infinitive mode, construction of a noun, obj. of *let* understood.
9. *Do know*, verb, irreg., intrans., act., prin. parts, know, knew, known, 1st person sing., to agree with sub, *I*. *Where* is a conjunctive adverb. It connects the two sentences and limits *is*.
10. The molasses is excellent. Each strove to recover his position.

PHYSIOLOGY.

1. The bones are softer and less brittle in early life and consequently less liable to be broken in the active and careless career of childhood. Their soft condition permits more rapid growth and development.
2. Exercise aids digestion by stimulating the circulation of the blood and increasing the excretion of waste material. It strengthens the muscular tissue by bringing it into use and aids all the operations of the body by equalizing the circulation.
3. Those who labor with their brains require the most sleep because the tissues are wasted more rapidly by mental labor and need more time for repairs.

4. We suppose he meant that we should wear the same amount of clothing in summer as in winter. If this is what he meant we can not agree with him.

5. By food is meant anything which, when taken into the blood, is assimilated or built up into the tissues of the body. All our food is derived directly or indirectly from the vegetable kingdom and originally from the mineral kingdom.

6. Insalivation is the mingling of the saliva with the food during the process of mastication. It serves, 1st, to moisten and lubricate the food to aid in mastication and deglutition, 2nd, to dissolve solid portions of food so that they may affect the nerves of taste, and 3d, to change starch into sugar.

7. The systemic circulation by which the blood is carried from the heart to all parts of the body and back again to the heart. The pulmonary by which the blood is carried to the lungs for purification and back again to the heart. The circulation of blood in the capillaries may be considered as a distinct system of circulation making three systems in all.

8. The air of a sick room is more or less injurious even with all precautions. The room should be well ventilated. Vessels of water should be kept in the room which should frequently be changed as water absorbs the foul exhalations. Persons in a sick room should breathe through the nostrils and not through the mouth, and should never enter a sick room to remain long if hungry and exhausted. If these precautions are taken a sick room even under the worst forms of disease is comparatively harmless to persons in good health.

9. Flowers and plants in the school room are not injurious if ventilation is attended to and they are not in too great number. We would advise their presence for their value as objects of beauty, making a room look home-like and attractive.

10. Pain is necessary to warn us of danger. If it were not for pain we would constantly be doing ourselves injury.

THEORY AND PRACTICE.

The objects of a recitation are 1st, Examination or finding out what the pupil has learned by study. This is to be accomplished by questions, by requiring pupils to report on topics, by written work on black board, solving examples, &c. Questions should not be too direct or such as will suggest the answer unless it be for very young pupils or for an occasional concert drill: 2nd, Imparting instruction where the teacher adds to what the pupils have recited information from his own store of knowledge or by directing the attention of the class to the information in the books as in preliminary drills, and in the explanation of difficult points in the lesson; 3d, Cultivation of mind by criticism and general drill in neatness and accuracy of expression and written work; and 4th, Stirring up mind by proper questions, suggestions and directions as to methods of study.

COLLEGE DEPARTMENT.

DEVOTED TO THE INTERESTS OF THE CENTRAL NORMAL
DANVILLE, INDIANA.

CONDUCTED BY G. DALLAS LIND.

DEAR FRIENDS:—Notwithstanding we have just passed through a heated political contest here in Indiana, the Central Normal has moved on steadily with its work. Our students are here for a purpose and they have not allowed outside matters to disturb them in the pursuit of that purpose. Of course there was an interest manifested in the political work which was going on, but not such as would disturb their more important work of preparing to be citizens of this great Republic.

Our General Exercises have been of unusual interest this term. Brief lectures each morning on some important topic from different members' of the faculty have contributed much to the interest and value of these morning exercises. We have had an exposition of some of the latest discoveries in science by Dr. Tingley, some excellent talks on Literature and language by Miss Dora, and Miss Kate, and Prof. Spillman, while Profs. Adams and Steele have given us practical talks on various subjects.

Prof. Clancy, the "funny" elocutionist, has been with us for several weeks.

Now let us take a peep at Prof. Adams' mail and hear some news from old Normalites:

Thos. Riner is teaching two miles from home in Ohio. He says, "I realize the results of my work and instruction at the Normal." He expects to take the Scientific Course next year.

Our young friend M. E. Patrick, having received a good certificate, is teaching in Perry county.

C. A. Markland writes from Decatur county.

Robt. A. Trippet is teaching in Gibson county. He is remembered here by scores of friends.

T. J. Engleman, writing from Harrison county, sends greetings to his old friends, and desires to meet them all here next spring. That is what we desire also.

G. O. Moore and E. Purdy have positions this year on the janitorial staff.

Lafe Stephens and E. M. Palmer are attending medical lectures in Cincinnati.

C. F. Allen is teaching in Marion county.

L. E. Jay gave his friends a pleasant surprise by putting in his appearance at Commencement. He is now at Sheridan.

G. W. Allen is Principal at Rensselaer, Ind. He will go to Ann Arbor next year. He is a thorough Normalite, and made many friends while at the Normal.

J. V. Martin, having had glorious success for three years as Principal at Booneville, has taken a position in the Indianapolis High School. He has charge of Mathematics. His success is the more assured from the fact that he lately took unto himself a wife. The Normal sends congratulations.

L. R. Ginn teaches in Henry county—will return to the Normal as soon as his school closes.

T. M. Johnson is taking care of Normal interests in Huntington county.

Miss Kate Stradling, writing from Muncie, says among other things: "Of course Miss Jennie Jones and Mr. Shirey are progressing finely." You would emphasize the "of course" if you could see them delving into their work. Miss Kate will teach near home and will certainly have a good school.

Eugene Ausbrooks writes from Illinois. His health has improved.

Ira E. Dunlavy sends greeting from Fillmore.

Smith Sayers writes from Jennings county—is well and, we suppose doing well.

J. L. Hubbarth is teaching young ideas in Dearborn county how to shoot.

C. P. Barber is back at the Normal.

G. E. Rohrabauqh did not return, but he sent an able substitute, his brother, who is taking the Scientific Course.

C. S. Reed says, "I'll be with you again in the spring." He does not need the assurance that he will be welcome.

E. J. Goar writes from Frankfort, Ind.

J. Q. Allen is attending Medical Lectures at Indianapolis. His place in the library of the Normal is filled by J. A. H. Stagg.

J. R. Tanquary, of Illinois, is with us again and doing fine work.

A. W. Swain writes from Morristown.

E. H. Stradling will teach near Muncie and return in the spring preparatory to taking the Scientific Course next year.

G. L. Roberts, writing from Decatur county, says, "I am enjoying myself very well; but would prefer to be at the C. N. C."

W. K. Prichard is attending a Medical College in West Virginia.

G. M. Dodd says, "With you or not with you, I am a firm friend of the Normal."

E. L. Perrin says, "When I come to apply what I have learned, I feel amply rewarded for time and money invested in the Central Normal."

C. S. Compton is studying law at Princeton, Ind.

J. F. Miller, writing from Milroy, sends his *very best* wishes to Faculty and students.

T. J. Holmes says he will be with us next spring and summer.

R. W. Holland is teaching near Lennoxburg, Ky. He has sent several of his friends to the Normal.

Our former co-worker and friend, J. F. Stephens, gave us a very pleasant visit recently. J. F. finds farming much more conducive to health than school life.

A. C. Bridges, J. C. Bridges and Marshall Underwood gave us a flying visit in time of the fair.

Our Kentucky friend, John Morris, is teaching in Preble county, Ohio.

Miss Nannie Owen teaches in Benton county.

Miss Anna Rundle, writing from her home in Illinois, says, "I never realized how much I had learned in the Training Class till I went into the school room. Hope to return to the Normal to greet old friends with the 'Normal hand-shake.'"

By the way, we have about 20 representatives from old Kentucky, and others are making arrangements to come. A goodly number of these were the pupils and friends of the Principal when he taught in Kentucky a few years ago. This speaks for itself.

A letter from D. W. Gwaltney shows his interest in the Central Normal. Among other things he says, "Normal principles work well, both in farming and teaching. No one should fail to attend the Training Class. Even if he never expects to teach, *it is the class.*"

Effie Thomas says, "I shall always speak a good word for the Normal and ever remember the kindness of my teachers."

M. H. Wilson, Morristown, O., says, "Give Prof. Steele my best wishes for the success of his Geometry class. I am pleased to be able to recommend your school highly to all my acquaintances."

W. H. Crackel writes from Grayville, Ill.

Miss Kate Burton, Mitchell, Ind., sends kindest regards to pupils and teachers. She is kindly remembered by a large circle of friends.

C. F. Allen, who was a Central Normalite fifty-nine weeks says, "I will gladly do all in my power to advance the interests of the Central Normal. I have been connected with the school long enough to know something of its merits, and can recommend it to any one wishing a good practical education with the least possible outlay of money."

G. V. Buchanan, writing from his home in Illinois, says, "Several have promised to come with me to take the Scientific Course next year."

T. E. McIntyre writes from Eaton, O.

J. T. Goodman says, "It will afford me great pleasure to do all I can for you."

Otis Patterson, when last heard from, was rustivating for his health in Iowa, Kansas, and Wisconsin.

W. O. Smith, recently made his Danville friends happy by a flying visit.

"To EDUCATE the intellect is to unfold, direct, and strengthen it, that it shall be prepared to be, through all its future course, a zealous and successful sector *after truth.*"—Aionzo Potter.

PUBLISHER'S DEPARTMENT.

IN sending stamps to this office send *only* of 1-cent denomination.

Now is a good time to make up clubs. Send for our Premium Circular.

WHEN writing to have your address changed please give the old post-office as well as the new.

WE are now offering extra terms on our books, to hold good until January 1. All of our readers interested in the circulation of our books would do well to send for circular.

WE call attention to the many new advertisements this month. It will pay to read them. In fact it always pays to read the advertisements. In answering any of them do not fail to mention THE NORMAL TEACHER. This will be an advantage to you.

WE again call attention to the advertisement of Professor Dale's new work on Elocution, on second page of cover, and to the very liberal offer contained therein. We hope that all of our readers will accept the offer. We never made a more liberal one.

J. P. WRIGHT, formerly Clerk in the Central Normal College, is General Agent for our House in the Counties of Pike, Posey, Gibson, and Vanderburg. His headquarters are at Patoka, Gibson Co., Ind., where all communications and orders for his territory should be addressed.

THOMAS L. SAWYER, school commissioner of Newton county, Missouri, is doing a most excellent work for the schools of his county. His plan is worthy of imitation by every County Superintendent and Commissioner in the United States. We give below the partial contents of a letter just received from him. We hope many will follow his example:

DEAR SIR—Please find enclosed \$1.80 in stamps in payment of the twelve "Queer Queries" you sent and for which I receipted you. Have sold all but two and as I will make a trip this week to visit schools, will take them and a few of all your books, and TEACHER and hope to make a good report on my return. I find an interest is being felt in education in our county by reading your works and I am determined to stir up people and teachers. I give every teacher a copy of THE NORMAL TEACHER and have the promise of some twenty to subscribe as soon as they get their first month's wages. I wish you would send me a good lot of October numbers, as I can see the good they are doing. I was appointed Commissioner in January and my term expires in April, but I flatter myself that our teachers are

reading more than they have ever done before; and if I am elected in April I will have 75 or 80 subscribers; they need stirring up, and they will get it. I am driving the dead beats out of our county, and am working in good ones. Yours truly,

T. L. SAWYER.

BOOK TABLE.

BACON' ESSAYS, With Annotations. By Richard Whately, D. D., and Notes and a Glossarial Index, by Franklin Fiske Heard, Boston: Lee & Shepard. New York: Chas. T. Dillingham. Cloth, Student's Edition, pp. 641.

This great thinker and writer of the Elizabethan age is best known by his Essays because, as he, himself, said "they come home to men's business and bosoms." The student who wishes a copy of Bacon's Essays should procure this edition. The Annotations need no recommendation as the name of Richard Whately is sufficient. Lee & Shepard are to be congratulated for bringing out such an excellent work in such excellent style. No library can be complete without a volume of Bacon's and this is the one we would recommend to the purchaser.

ELEMENTARY PRINCIPLES OF SCIENTIFIC AGRICULTURE; By N. S. Lupton, Prof. of Chemistry in Vanderbilt University, Nashville, Tenn. New York: D. Appleton & Co.

This little work of 100 pages was prepared by Prof. Lupton to answer the demand of the laws of the State of Tennessee, which require that the elementary principles of agriculture be taught in the public schools. It treats in a plain and simple manner of the chemistry of soils, manures and plants, the rotation of crops, care of live stock, &c. An appendix gives a number of simple and easy experiments. We can only say that the book we think will prove to be just the thing for the end desired.

ODDMENTS OF ANDEAN DIPLOMACY, and Other Oddments: including a proposition for a Double-Track Steel Railway from the westerly shores of Hudson Bay to the midway margin of the Strait of Magellan; the two terminal points, measured along the line contemplated, being nearly, if not quite, eight thousand miles apart; Together with an inquiry whether, in view of certain facts of grave international and inter-colonial polity and proceedings herein portrayed, the proposed road should not, in all justice and fairness, and in conformity with the highest attributes of republican foresight and vigilance, be deflected as far away from Brazil as to cut her off entirely from its boundless benefits so long as her antiquated and antagonistic system of government remains imperial or otherwise monarchical. By Hinton Rowan Helper. St. Louis: W. S. Bryan, Publisher.

The lengthy title page which we have given above will perhaps give as clear an idea of the contents of the book as we could give in our limited space. We have only to say that Hinton Rowan Helper is the author of a book which appeared in 1857 which had such an immense circulation. Many of our readers will at once recognize the author. The present volume contains 480 pp. printed on fine paper and neatly bound in cloth.

AMONG OUR EXCHANGES.

The American Kindergarten Magazine—Edited by Emily M. Coe, New York. \$1.00 a year. October, 1880.

Miss Coe has the distinguished satisfaction of being a Kindergarten heretic, that is, she is not in good standing with the orthodox Kindergarteners, whose special lofty-nosed boast is that they are in the direct line of the Froebelian apostolic succession, while Miss Coe is a shallow, outside-of-the ring upstart, who is therefore a sham and a fraud and a quack. Our sympathies are decidedly with Miss Coe, although we have not one particle of sympathy for the Kindergarten movement as a part of our public school system. It may be all right for the state to teach, but when it invades the family and robs the cradle for the purpose of running, we confess we are not Spartan enough to approve of it. What more could the wildest communism ask?

Canada School Journal—Sept., 1880. Toronto.

This Monthly has the appearance of a solid, efficient, well-sustained organ. This number sounds the note of "over-pressure" in the schools. It presents the two views in a very able and interesting manner.

Iowa Normal Monthly—Sept., 1880. W. J. Shoup & Co., Dubuque, Iowa.

The opening article, "Work Again," is a good, suitable one for the country school teacher opening his school. The selected material is excellent. The news department is well sustained. The Iowa teacher ought to take this paper, whether he can afford it or not. He can afford to take it—and THE NORMAL TEACHER.

The Institute Worker—Sept., 1880. T. W. Fields, Powers, Jay Co., Ind.

This is a new enterprise in a new field. It is especially designed for the encouragement and direction of teachers of Indiana, with reference to their township institutes. It will certainly find friends. Mr. Fields is an energetic, practical teacher. We wish him abundant success.

The Indiana School Journal—This periodical needs no favors or announcements from us or anybody else. It is one of the oldest educational in the United States. Every teacher in Indiana hears of it faithfully at least once a year and probably sees it as often, whether he subscribes for it or not. Its editor, Mr. Bell, is well known as a sincere, earnest worker, with strong convictions and undoubted ability to set them forth. He has lately experienced some difficulty in handling without touching the young "Normals" of Indiana. His late attempt in the August Journal interested us. Patrick Henry was hardly more successful with George III. Look out, Bro. Bell, you may be misunderstood. Dashes and exclamation points are good protection, but they are so suggestive. Now what if some sensitive, un-state, unorthodox, Normal School man should conclude that you in-

tended to call him a liar and his work a humbug, [which we verily believe your language could, by a not unfair interpretation, be made to signify] what great injustice would be done to your high soul and lofty character. For anyone who knows you knows that you would not descend to notice in your respectable journal *certain* Normal Schools [unless you were paid for it as advertising] much less would you be guilty of the vulgarity which such an expression indicates. Playing with good flour will make most anybody white.

But we have departed somewhat from our purpose. We intended merely to give the Indiana School Journal a good, kindly notice. It is a good paper. Its editor is a good man, with good ideas, with good ability to express them, except when he is a little in doubt about them, when, since copy must be furnished, he makes out very well with quads and punctuation marks.

Kindergarten Messenger, and the New Education—For parents and teachers. Devoted to Kindergarten Culture and Educational Hygiene in Home and School. Edited by W. N. Hailman; July, 1880. Milwaukee: \$1.00.

The editor of this paper, Mr. Hailman, is the author of a little work "History of Pedagogy," which we can recommend. He is certainly competent to speak for Kindergartenism, if anyone is in this country. We commend this paper to those interested.

The Little Gem and Kindergarten—E. B. Grannis is Proprietor and Publisher, 22 Beekman St., New York. Aug., 1880.

This is a beautiful child's and mother's paper. It is abundantly illustrated.

The Western Educational Review—Vol. I, No. 5, Sept., 1880. Ft. Scott, Kansas.

This paper is published by our worthy young friends D. E. Sanders and S. M. Cutler, in the interests of the Kansas Normal College of which they are the Associate Principals. We bespeak for it a growing success.

The School Visitor—Devoted to the study of Mathematics and English Grammar. 60 cents a year. Ansonia, O. Published by J. S. Royer.

If we understand it, this paper is published by a County Examiner for the instruction of the teachers of his own and all other counties. We can speak more emphatically of it when we become better acquainted with it.

The Pacific School and Home Journal—San Francisco. Sept., 1880. The opening article, "Some Reminiscences of Boston Schools Fifty Years Ago," is a most excellent one of a very interesting series. The Journal is deservedly prosperous. The editor shows himself able and alive.

The Practical Teacher—Semi-Monthly. \$1.25 a year. Chicago. A brisk, practical, pungent, pointed paper.

The Pennsylvania School Journal—Sept., 1880. \$1.60 a year. J. P. Wickersham, Editor.

The State Teachers' Association Proceedings and products fill the most of this number. The most interesting discussion is that upon "Examinations," lead by an able paper by Prof. Richards on the "Use and Abuse of Examinations." There is a rebellion on foot in Pennsylvania against the hazy examination farce. God speed it.

The Ohio Educational Journal—The oldest and most revered of the educational. Everybody knows it. Every teacher in Ohio should subscribe for it.

The Western Normal Educator—Ed. B. Smith, Editor. Ladoga, Ind.

A very interesting feature of this paper is the biographical sketch which opens each number. The first one, we believe, was that of Prof. A. Holbrook, Principal of National Normal School, Lebanon, O. The present one is of Prof. A. Campbell Goodwin, a candidate for the State Superintendency of Schools in Indiana.

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A CARD TO TEACHERS. If you have school books which you do not care to keep, I will take them in exchange for books you may need. Please send me a list of those you would exchange or sell. Orders solicited for cheap school books, and for miscellaneous books. Send your orders to C. M. BARNES, 63 and 65 Washington St., Chicago, Ill.

PUBLIC SCHOOL TEACHERS ENDORSE:

THE WESTERN EDUCATIONAL JOURNAL, as being as claimed, *ambitious, progressive, thoroughly Western.*

MONTHLY—FIFTY CENTS—YEARLY.

Our readers have found that we have more than fulfilled our promises for 1880, and we shall for 1881 make still greater efforts. Herewith is given a few extracts from letters received:

"Yours is the best paper I take."—"Instructive in my school work."—"It is practical talk, not theory."—"Do not wish to miss a single number."—"It is just the paper needed in my school."—"Article on 'Quincy system alone worth fifty cents.'"—"Music and Drawing plates eagerly grasped by pupils."—"It contains an abundance of information valuable to the live teacher."—"I take six educational journals and am free to say yours is my favorite."—"I think the articles the ablest I have read, and look eagerly for its coming every month."—"Educational articles interesting and instructive; as a whole is the chattiest and most interesting of its kind."—"It is rich in information and abounds with practical ideas. All its departments are exceedingly instructive."

Read Proposition to Subscribers, Below.

WAGGONER PROGRESSIVE DRAWING CARDS.

"Are a great help in drawing."—"I find your cards just what I want."—"They are a great help to my pupils."—"Were used in school soon as they came to hand."—"Forward dozen sets at once; children are delighted."—"School is like a new place since they were introduced."—"They are regular beauties, much better than I hoped for."—"The varieties are good, and my six year old scholars can nearly imitate each one. Cannot do without them."—"They help me both in my own drawing and in teaching."

These cards are neatly put up in sets of six each (5x7), and contain seventy two examples graded to suit the youngest person that can use a pencil. Teachers desiring to secure a quantity for use in their schools, will please correspond, and special rates will gladly be given. A full and complete set, postpaid. Price 15 cents. (With every set is enclosed THE WAGGONER SCHOOL RULER.)

PUBLIC SCHOOL TEACHERS ENDORSE:

WAGGONER'S SCHOOL MOTTOES, as being one of the best means for *awakening and interesting pupils.*

"Am highly pleased."—"I have used the mottoes with success."—"They are just what I want in my school."—"They excel all my most sanguine expectations."—"Would not part with them for four times their cost."—"Those mottoes—well, I could not teach without them."—"The mottoes are a valuable acquisition to my school-room."—"Hung them yesterday, and their influence was distinctly marked."—"They adorn the room as well as awakening and interesting the pupils."—"It is only after the teacher has once used your mottoes that he can appreciate their advantages."—"The mottoes are just what every teacher should have to adorn his school room, and to advise his scholars to diligence."

Read Proposition to Subscribers, Below.

Teachers and Scholars Delighted With the Waggoner School Ruler.

And the new Ruler now offered is much superior to old ones, for they have *Steel Plate Engravings* on same side with the measure (which shows inches, in halves, quarters and eighths), and the reverse side has *Hints* which if followed, will produce greater results in schools. The board is thick, tough, suited to all uses, and of beautiful tints. The Waggoner Ruler will doubtless

TAKE THE PLACE OF REWARD CARDS,

for teachers will find them equally as acceptable to the scholar. The Rulers are put up in packages of 25 each assorted engravings and tints, with tissue paper between each, which is required by the finest of the work.

Prices—25, 25 cents; 50, 40 cents; 100, 60 cents, postpaid.

Our Proposition.

To each and every person sending us ONE DOLLAR, we will furnish, postpaid, the *Western Educational Journal*, for balance of 1880, and all of 1881, also one set Waggoner School Mottoes, one set Waggoner Drawing Cards, and 25 Waggoner School Rulers. Subscriptions to begin on receipt of order. This proposition is one unprecedented for worth and liberality. Address all orders,

THE WESTERN EDUCATIONAL JOURNAL, Chicago.

THE NORMAL TEACHER.

VOL. III. DANVILLE, IND., DECEMBER, 1880. No. 10.

U. S. BONDS.

F. F. PRIGG.

In Article I, Section 8, Clause 2, of the U. S. Constitution, we find the following:

"The Congress shall have power to borrow money on the credit of the United States."

The usual way of making these loans is to issue *bonds* of the government, which are similar to a note, being the promise of the government to pay a certain sum at a given time with interest at specified rates, usually payable semi-annually.

The bonds issued to pay the debt of the late rebellion are of various denominations, \$50, \$100, \$500, \$1000, etc.

The *seven-thirties* (7-30's) were called treasury notes, and both principal and interest were payable in currency. The rate of interest was 7.30, from which they were named. This rate gives one cent a day interest on \$50 making the computation easy.

The *five-twenties* (5-20's) are payable, principal and interest in gold, and are named from the time of payment. The government may pay them at the end of five years, or it may wait twenty years. The interest is six per cent. per

annum, which paid semi-annually equals $6\frac{1}{8}\%$ per cent. payable annually.

The *ten-forties* (10-40's) are named from time of payment, and bear interest at five per cent. per annum, in gold.

The 6's of '81 bear 6% interest and are payable in '81, interest payable semi-annually in gold.

5's of '81, interest payable quarterly in gold, are due in '81 and pay 5% interest.

In 1870 Congress authorized the issue of \$200,000,000 of 5% bonds redeemable after ten years at the pleasure of the Government; \$300,000,000 of $4\frac{1}{2}\%$ bonds redeemable after fifteen years; and \$1,000,000,000 of 4% bonds redeemable after 30 years. These bonds pay the interest quarterly in gold, and are themselves payable in gold, as are all the bonds that are out. The names of the bonds issued under this act, are as follows: 5's of '81, $4\frac{1}{2}$'s of '86, 4's of 1901.

The 4% consols are redeemable after 30 years from July 1, 1877. These bonds are to be sold at not less than par, the proceeds to be applied to redeeming the 5-20's.

This change of bonds paying a low rate for the 5-20's is saving the Government a vast amount of interest.

Bonds and Greenbacks are both *notes* on the U. S. Government, neither being taxable by the State Governments and the latter paying no interest.

I KNOW not where His islands lift
Their fronded palms in air;
I only know I cannot drift
Beyond His love and care.

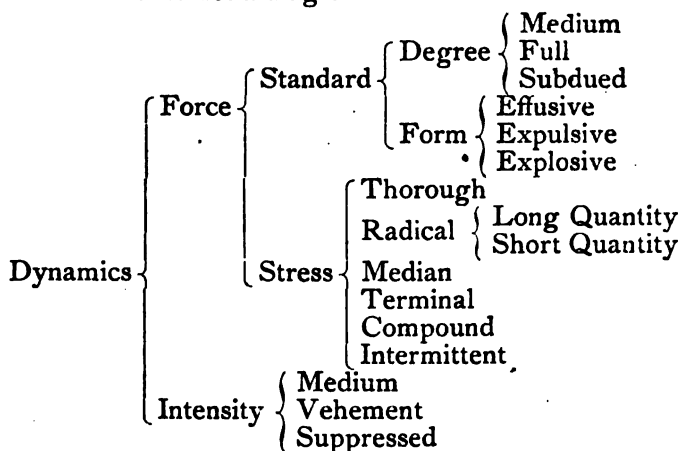
And so, beside the silent sea
I wait the muffled oar;
No harm from Him can come to me,
On ocean or on shore.

— *Whittier.*

TALKS ON ELOCUTION.—NO. VIII.

G. WALTER DALE.

My dear friends, to-day a condensed Talk about FORCE. In the course of my study recently, I felt called upon to make some radical changes in my former view of Force, to conform more closely to the philosophical analysis of Elocution. Force is not a very good word for the embodiment of a complete idea of Dynamics in Elocution. I think the word just used is better but it sounds very technical. Let us try it once and construct a diagram.



Here we have a new element, unknown in most books, indeed I do not know of it being introduced any where as a separate element, called Intensity.

Force is nearly, if not always recognized and defined as the degree of loudness of the sound. This is not enough, and to make it mean more seems to over charge the word. We may use great Intensity in a whisper, and when we do, it does not partake of the quality of loudness, which is involved if we say Force. In this diagram we find something new at the very outset; namely, the disposition of Force itself.

Most authors consider Form as a primary element. I think it is a subdivision of Standard Force, which is the prevailing loudness of the voice during the reading or recitation of an entire sentence, paragraph or discourse. This loudness consists of two elements—Volume and Penetration. Volume is an attribute, characteristic of the low notes of a grand organ, which possess but little penetration. The shrill notes of the fife illustrate most perfectly the penetration of which I speak. Standard Force, then, has Degree and Form, the latter relating to the manner of utterance. Form is distinctively a belonging of Force, because it modifies the force of the voice alone. I shall not define these elements, as I accept the definitions of any standard author and I shall spare you that infliction, but I insist on this arrangement as the only logical and philosophical following of effects. I must explain what I mean by long and short, quantity in radical stress.

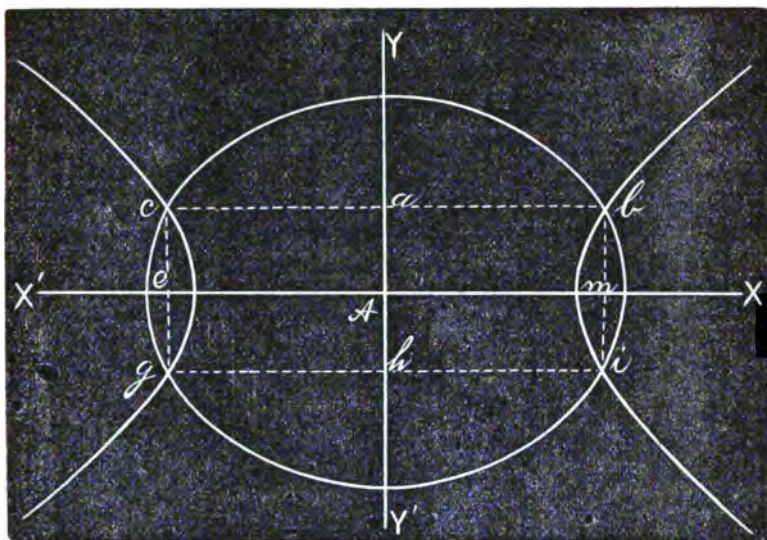
When we use the Expulsive Form the Stress is Long, and when we use Explosive Form it is Short.

A word in closing about Intensity. This is the measure of Vehemence or earnestness of the utterance, and may be Medium, as in ordinary conversation, Vehement, as in high tragedy or Suppressed, as in the most characteristic tranquillity—"Drifting," by T. B. Read, for illustration. I hope you will find this diagram, and the remarks upon it of service in your pursuance of this study and take my good intentions as earnest for the will I have for giving a much longer Talk if my time would admit. Excused.

BEAUTIES OF HIGHER ALGEBRAIC EQUATIONS.—NO. IV.

ELIAS SCHNEIDER.

The equation (1) is an equation of an ellipse, and equation (2) is an equation of the hyperbola



$$25y^2 + 16x^2 = 1600 \quad (1)$$

$$16y^2 + 9x^2 = -576 \quad (2)$$

Let us see how beautifully these figures show their points of intersection. $y^2 = \frac{1600 - 16x^2}{25}$ or $y = \pm \sqrt{\frac{1600 - 16x^2}{25}}$ from (1)

$$y^2 = \frac{9x^2 - 576}{16} \text{ or } y = \pm \sqrt{\frac{9x^2 - 576}{16}} \text{ from } (2)$$

$+\sqrt{\frac{1600 - 16x^2}{25}} = +\sqrt{\frac{9x^2 - 576}{16}}$ by equation the two values of y.

$25600 - 256x^2 = 225x^2 - 14400$ by squaring and clearing of fractions.

$$481x^2 = 40000 \text{ by transposing.}$$

$$x^2 = 83.1600$$

$$x = \pm 9.12$$

If we take the minus values of y, and square them, we get the same result. This is as it should be, for x has two plus and two minus values, and so has y.

Now substitute these values of x into $y^2 = \frac{1600 - 16x^2}{25}$ and

we have $y^2 = \frac{1600 - 16 \times 83.16}{25} = 10.76$ or $y = \pm 3.28$.

The two equal plus values of x are a b , and h i ; the two equal minus values of x are a c and h g . The two equal plus values of y are m b and e c ; the two equal minus values of y are m i and e g . There are therefore four points of intersection.

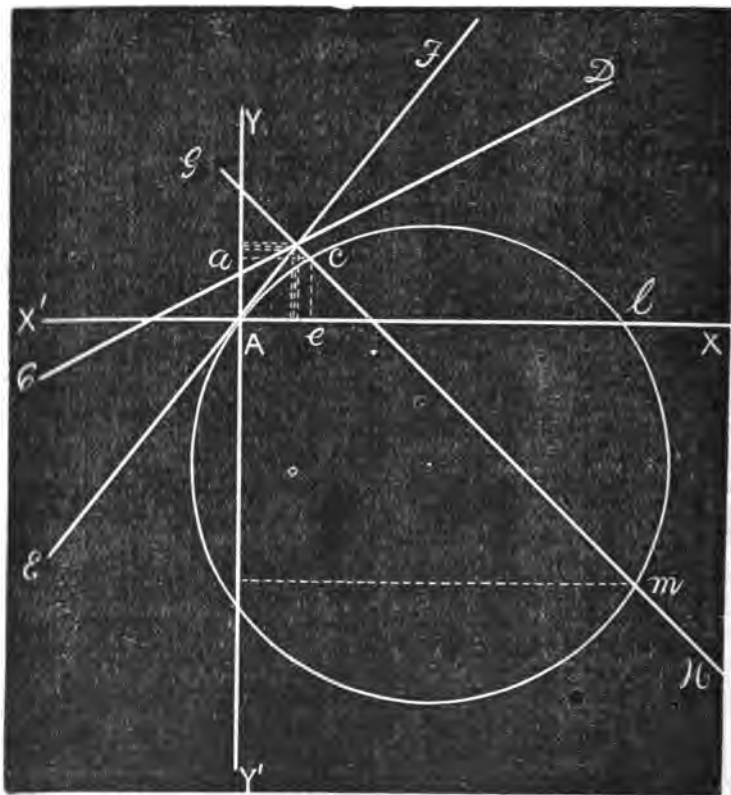
Let us next consider the following four equations:

$$x^2 - 8x + y^2 + 6y = 0 \quad (1)$$

$$y = \frac{1}{2}x + 1 \quad (2)$$

$$3y = 4x \quad (3)$$

$$y = 3 - x \quad (4)$$



Let us first compare equation (1), that of the circle, with equation (2) that of the line C D.

$$x^2 - 8x + y^2 + 6y = 0 \quad (1)$$

$$y^2 + 6y = 8x - x^2 \quad \text{By transposition}$$

$$y = -3 \pm \sqrt{8x - x^2 + 9} \quad \text{By solution of the equation}$$

$$y = \frac{1}{2}x + 1 \quad (2)$$

$\frac{1}{2}x + 1 = -3 \pm \sqrt{8x - x^2 + 9}$ By equating the two values of y

$$\frac{1}{2}x + 4 = \pm \sqrt{8x - x^2 + 9} \quad \text{By transposing}$$

$$\frac{1}{4}x^2 + 4x + 16 = 8x - x^2 + 9 \quad \text{By squaring}$$

$$5x^2 - 16x = -28 \quad \text{By reducing and transposing}$$

$$x^2 - \frac{16}{5}x = -\frac{28}{5} \quad \text{Dividing by 5}$$

$$x = \frac{8}{5} \pm \sqrt{-\frac{7}{5}} \quad \text{By solution.}$$

The result gives an indeterminate value of x. Hence the line C D and the circle do not intersect or meet, as the diagram shows.

Now equations (1) and (3), the latter being that of line E F.

$$3y = 4x \quad (3)$$

$$y = \frac{4}{3}x$$

$$\frac{4}{3}x = -3 \pm \sqrt{8x - x^2 + 9} \quad \text{By equating values of y}$$

$$\frac{4}{3}x + 3 = \pm \sqrt{8x - x^2 + 9} \quad \text{By transposing}$$

$$\frac{16}{9}x^2 + 8x + 9 = 8x - x^2 + 9 \quad \text{By squaring}$$

$$16x^2 + 72x + 81 = 72x - 9x^2 + 81 \quad \text{By clearing}$$

$$25x^2 = 0 \quad \text{By transposing}$$

$$x = 0$$

Substitute this value of x in $y = \frac{4}{3}x$, and we get

$$y = \frac{4}{3} \times 0 = 0$$

This shows that the line E F and the circle meet at the origin A which is 0.

Let us now try equation (4), that of the line G H, with the equation of the circle

$$y = 3 - x \quad (4)$$

$$3 - x = -3 \pm \sqrt{8x - x^2 + 9} \quad \text{By equating the values of y}$$

$$6-x = \pm \sqrt{8x-x^2+9} \quad \text{By transposing}$$

$$36-12x+x^2=8x-x^2+9 \quad \text{By squaring}$$

$$x^2-10x=-13.5 \quad \text{By transposing and simplifying}$$

$$x=5 \pm \sqrt{-13.5+25}=11.5$$

$$x=5 \pm 3.39=8.39 \text{ or } 1.61$$

Substitute the values of x into $y=3-x$ and we get

$$y=3-8.39=-5.39$$

$$y=3-1.61=+1.39$$

The line G H intersects the curve therefore at the points c and m . That is $+x=a c$ and $n m=+1.61$ and $+8.39$; and $+y=e c, =+1.39$, and $-y=l m=-5.39$.

It will be observed that the three lines, C D, E F, and G H intersect one another at nearly the same point. This is also indicated by the points expressed by the equations of these lines. By comparing equations (2) and (3), we find the point of intersection expressed by $x=1.2$, and $y=1.6$. By comparing equations (2) and (4), the point of intersection is $x=1\frac{1}{2}$ and $y=1\frac{2}{3}$. And by comparing (3) and (4) this point is $x=1\frac{1}{2}$ and $y=1\frac{1}{2}$.

This article closes this series on Algebraic Equations. The subject is full of interest, and the more carefully the teacher studies it, as contained in our books on analytical geometry, the better he will like it.

Do NOT expect more esteem from others because you deserve more, but reflect they will expect more merit in yourself.

THE student should be impressed with the truth that patience and perseverance only will insure success. Every difficulty that he encounters and overcomes is a victory won, and this victory ever stands up before him as a monument of his power, and inspires him with enthusiasm and self-confidence. It is not genius so much as patient, persistent effort that makes the scholar, philosopher, statesman or teacher.—*T. B. Noss.*

CORRESPONDENCE.

"WHAT IS THE MATTER WITH OUR HIGH SCHOOLS?"

AN ANSWER.

Editors Normal Teacher:

I have read an article in your October number headed, "What is Wrong with Our High Schools?"

In reply I have to say that I do not think the statements made by "A Friend of Our City School," are substantiated by the facts.

It is not true that "the members of the graduating class always graduate—none have been known to fail." It is not true that "their per cents. secured at the competitive examinations for class honors are always way up among the 88 per cents. and 94 per cents." Of the members of the classes of '79 and '80, more than one-half fell below 88 per cent. as is plainly stated in the Annual Reports of the schools.

The writer is mistaken in thinking that "the largest half prefer to teach in our schools." Fourteen of our thirty-one graduates have taught or have been examined for a license.

I do not believe it is true that they "seem unable to concentrate their knowledge on these simple branches, and usually secure low grades of scholarship, &c." An examination of the Record of the County Superintendent shows the following facts:

Number of persons examined within 12 months past,—240. Number receiving 24 months' license,—2, or 1%. No. receiving 18 months' license,—17, or 7%. No. receiving 12 months' license,—53, or 22%. No. receiving 6 months' license,—93, or 39%. No. failing,—75, or 31%.

Of the graduates of our High School, the number holding 24 months' license is 0. No. holding 18 months' license,—9, or 64%. No. holding 12 months' license,—1, or 7%. No. holding 6 months' license,—3, or 21%. No. who have failed to get a license,—1, or 8%.

As bearing upon the subject, I may say that one of our graduates taught two years in the City Schools of Huntington, Ind., the second year with an increased salary; she was re-appointed for another year but declined in order to take a situation in our schools, where she is doing good work. Another taught two years successfully in the schools of this County; two years in our City Schools; was re-appointed for this year but declined in order to accept a business situation at a much higher salary. A third taught very successfully two years in Rochester, Ind.; was re-appointed for another year, and is now doing good service in our own schools. A fourth is serving a second year at Marion, Ind., with a good record. A fifth has taught successfully in Kendallville, Rochester, and Bourbon. The others have taught in town and country schools with more than fair success.

Of our graduates who have not taught, four are clerks, five are in College, one is a bank cashier, one is a married lady, six are at home. One of the class of '78, with a few weeks of private lessons in Latin, entered Cornell University and passed all his examinations at the end of the first year without conditions, in spite of the fact that we have no Latin or Greek in our Course. Another pupil left the High School one year before graduating, attended Michigan University one year, and entered the University without conditions.

I am willing to admit that the remainder of the article referred to is correct.

In answer to the question, "What is Wrong with Our High School?" I will say that the principal wrong, and one which we are striving to right, is the *diminutiveness of our library*. Will not "A Friend of Our City Schools," show his friendship by sending us one or more volumes for the library?

Supt. Plymouth Schools.

R. A. CHASE.

MULTIPLICATION AND DIVISION OF FRACTIONS.

Editors Normal Teacher:

In our text-books on Arithmetic are given eight rules for working multiplication and division of fractions. One is sufficient and saves the pupil much labor and trouble. It may be enunciated as follows:

Draw a vertical line. Above place multiplicands and dividends; below place multipliers, and divisors inverted. Numerators on the right, denominators on the left. Cancel across the line as far as possible. Then divide the product of the remaining right hand factors by the product of those on the left.

I will first work three examples in multiplication of fractions:

Multiply $\frac{4}{5}$ by 20.

$$\begin{array}{r|l} 4 & 3 \\ & 20 \\ - & \\ \hline & 15 \text{ Ans.} \end{array}$$

Multiply 40 by $\frac{3}{8}$.

$$\begin{array}{r|l} 8 & 40 \\ & 6 \\ - & \\ \hline & 30 \text{ Ans.} \end{array}$$

Multiply $\frac{12}{4}$ by $\frac{3}{8}$.

$$\begin{array}{r|l} 12 & 10 \\ 4 & 3 \\ - & \\ \hline 8 & 5, \text{ or } \frac{5}{8}. \end{array}$$

I will now give three in division of fractions:

Divide $\frac{9}{10}$ by $\frac{3}{4}$.

$$\begin{array}{r|l} 10 & 9 \\ 3 & 4 \\ - & \\ \hline & 1\frac{1}{3} \text{ Ans.} \end{array}$$

Divide $\frac{4}{3}$ by 2.

$$\begin{array}{r|l} 6 & 4 \\ 2 & \\ \hline 3 & 1 \text{ or } \frac{1}{3}, \text{ Ans.} \end{array}$$

Divide 36 by $\frac{4}{10}$.

$$\begin{array}{r|l} & 36 \\ 4 & 10 \\ \hline & 90 \text{ Ans.} \end{array}$$

The cancellation across the line is so simple that I need not illustrate it. Multiply $\frac{3}{2}$ of $\frac{2}{3}$ of $\frac{3}{4}$ by $\frac{1}{2}$ of $\frac{4}{3}$ of $\frac{3}{4}$.

$$\begin{array}{r|l} 3 & 2 \\ 6 & 3 \\ 9 & 8 \\ 2 & 1 \\ 8 & 4 \\ 4 & 3 \\ \hline 18 & 1 \text{ or } \frac{1}{18}, \text{ Ans.} \end{array}$$

Multiply $\frac{2}{3}$ of $5\frac{1}{2}$ of 8 by $\frac{1}{10}$ of $10\frac{1}{2}$ of 12.

$$\begin{array}{r|l} 6 & 2 \\ 3 & 16 \\ & 8 \\ 10 & 1 \\ 2 & 21 \\ & 12 \\ \hline & 179\frac{1}{2}, \text{ Ans.} \end{array}$$

Divide $\frac{2}{3}$ of $\frac{3}{2}$ of $8\frac{1}{2}$ by $\frac{1}{2}$ of $3\frac{1}{4}$ of 10.

$$\begin{array}{r|l} \{ 6 & 5 \\ & 2 \\ & 25 \\ & 2 \\ & 4 \\ 13 & \\ 10 & \\ \hline 351 & 100, \text{ or } \frac{100}{351}, \text{ Ans.} \end{array}$$

Now, this may be thought a small matter, and so it is in one sense. But it is a useful method and even young children may learn in an hour, so as never to forget it.

I have known pupils in these rules to flounder a whole session among numerators and denominators trying to remember the everlasting book rules, and at the end of a year get them mixed.

Let teachers adopt this simple way and note results. Trifling as it may seem at first, they will be delighted with the ease to the learner. How few teachers know the value of cancellation of numbers. T. H. R.

A CRITICISM ON AN ANSWER.

Editors Normal Teacher:

I have for some months past, admired the terseness and superior ability displayed in the answering of the State Board Questions in your journal,

but I dissent most forcibly from the answer of the ninth question in History, September number, 1880.

I see that it is taken from Ridpath, and so, properly, I "pick my crow" with the historian. Primarily, it is probably a typographical error that places the event on the 4th of March instead of the 14th of April, but that to which I object is the use of the term *disreputable* as applied to Booth.

Born and educated in Boston, the name of Booth was a familiar one to me in my earliest childhood. Junius Brutus Booth, an elder brother and actor, was for years the lessee and manager of the Boston Theatre, and there Edwin Booth's histrionic talents illuminated the genius of Shakespeare, notably in renditions of King Lear, Macbeth and Hamlet; the latter played at one time one hundred and sixty-five consecutive nights. Wilkes Booth, also a Boston favorite, had frequent engagements there, and in November 1864, played at the *Museum* in, I believe, "Our American Cousin," the same piece that Lincoln was witnessing when killed.

Of late years a resident of Baltimore (the home of the Booths), familiarizing myself with the antecedents of the family by a sight of their town residence; the country mansion in Towsontown (a suburb); their burial lot in Greenwood Cemetery, and hearing almost daily the many reminiscences of various members of the same, I have thus come to know them as a family brilliantly endowed by nature in form and mind, with rare beauty and superior talents, withal, somewhat erratic; but not to one of them can be applied the term *disreputable*.

To thousands of men and women along the Atlantic Seaboard, the startling intelligence (flashed over the wires that dismal April morning), that Booth had shot Lincoln seemed an absurdity—an utter impossibility; and when the hideous nightmare of uncertainty was dispelled by subsequent accounts of the tragedy, there were many who did, and still do believe, with that mantle of charity that covereth all things, that a diseased brain wrought upon by imaginary wrongs or a misguided purpose, had nerved the man of a sensitive temperament to a deed that, in his better hours, he would have shrunk from with horror.

To the lovers of the drama, the theatre going people of the eastern and middle states, he was a courtly, polished gentleman, an actor of versatile talents, and an accomplished scholar.

The enormity of the crime, the political status of the question, are outside matters upon which I have nothing to say, at least, in this article. Say, then, he was an actor, but never *disreputable*.

ALBERT P. SOUTHWICK.

The date referred to above was a typographical error. It should have been 14th of April.—[Eds.]

TEACHERS should adapt teaching to the wants of their mind until it can go on and acquire accurate knowledge of itself.

NOTES AND QUERIES.

. MATHEMATICS.

1. A log 18 feet long is 4 feet in diameter at one end, and 2 ft. at the other. How far from the small end will the log balance? M. H. B.

2. A blank paper-book containing 48 sheets is sold for \$3.50, and another containing 78 sheets of the same size for \$4.75; the binding costs the same in both, and the paper was of the same quality. What was the price of the binding? LIBRA.

3. A rectangular field is to be enclosed from the waste with a fence 40 chains long; it is to be surrounded within the fence, by a gravel walk 6.05 yards wide, and there is to be left in the middle an area of 6.05 acres of grass. What must be the dimensions of the field? *Id.*

4. How long will 10 men be in pumping dry the hold of a ship which contains 3,000 cubic feet of water, the center of gravity of the water being 14 feet below the deck, and each man being supposed to yield 1,500 units of effective work per min.? *Id.*

5. Is the Disc of a body equal to its circumference? M. B. H.

GRAMMAR.

1. Parse the word *not* in each of the following sentences:

Seek *not* to know what is improper for thee.

2. I come to bury Cæsar, *not* to praise him.

3. I prefer *not* to go if I am not wanted.

4. If I go, you may go *too*.

Parse "*too*."

JAMES H. GROVE.

5. Give the parsing of the following words:

"He esteems Sunday [to be] a day *to make* [to be] *merry* in."

And "The boy went *to sleep to make*, [to be] *merry* and [to sleep]."

H. M. B.

6. Is the sentence, "There is no doubt of it being they" correct?

If not, correct and analyze as corrected.

7. Analyze the following sentences:

"He shakes the wood on the mountain side." "Black crags behind thee pierce the clear blue sky." "He builds a palace of ice where the torrents fall."

8. In the sentences following give full construction and disposition of italicized words—and a diagram (by any method or system) of each:

"The Spartan youth *were accustomed to go barefoot*"—Greene's analysis.

"I live *near* the river."

T. P. BREMEAN.

9. What is the plural of Mrs.?

10. Form a sentence in which the subject shall be modified by an adjective, by a participle, by a possessive, by a noun in the same case, by a phrase, and by a clause. The predicate to be modified by an object, by an adverb, by a phrase, and by a clause.

GEO. A. KNEPPER.

MISCELLANEOUS.

1. Is there any way of determining the height of a room without actual measurement, and if so how can it be done?
2. Is Cuba still under the Government of Spain?
3. Where was the "Great Eastern" built and what was its size?
MINNIE MILLS.
4. How can it be proven that the diameter of the earth is nearly 8000 miles?
5. Why cannot Mercury and Venus be in quadrature? M. B. H.
6. Please tell me why the tropics of Cancer and Capricorn were placed where they are. Why were they not farther to the north or south?
7. Over how much space of the earth's surface does the sun throw vertical rays at any one time?
M. F. BROWER.

ANSWERS.

1. [Vol. III, No. 7, Q. 7, p. 261.]

Taking any number of two or more places of digits, show that that number must leave the same remainder when divided by 9, that the sum of its digits does.

Let us take 457, and let a, b, c represent its digits.

The number then is represented by $100a + 10b + c$.

Then as $100 = 99 + 1$, and $10 = 9 + 1$, $100a + 10b + c = (99 + 1)a + (9 + 1)b + c = 99a + a + 9b + b + c = (99a + 9b) + (a + b + c)$.

Now $(99a + 9b)$ in this form is evidently divisible by 9, and the remainder arises from the division $a + b + c$.

But $a + b + c =$ the sum of the digits.

$457 = 100 \times 4 + 10 \times 5 + 7 = (99 + 1)4 + (9 + 1)5 + 7 = (4 \times 99 + 5 \times 9) + (4 + 5 + 7)$.

Here the part $(4 \times 99 + 5 \times 9)$ is evidently divisible by nine.

Hence the remainder arises from the division $(4 + 5 + 7)$.

But the part $(4 + 5 + 7)$ is the sum of the digits, and, if divided by 9, leaves 7, as does the number 457.

MIGNONETTE.

2. [Vol. III, No. 8, Q. 1, p. 299.]

Given $\sqrt{7-x} = 11 - x^2$, to find the value of x .

By squaring, $7 - x = 121 - 22x^2 + x^4$, or,

$x^4 - 22x^2 + x + 114 = (x-3)(x^2 + 3x^2 - 13x - 38) = 0$; whence, taking out the factor $(x^2 + 3x^2 - 13x - 38)$, we have $x - 3 = 0$, or $x = 3$.

L. A. REED.

3. [Vol. III, No. 8, Q. 5, p. 299.]

Divide the fraction $\frac{534y-195x}{195y}$ into two such parts that the sum of the numerators shall equal the sum of the denominators.

Let $\frac{x}{y}$ be one fraction then $\frac{534y-195x}{195y} - \frac{x}{y}$ or $\frac{534y-195x}{195y} =$ the other. But from the problem $534y - 195x + x = 195y + y$ or $338y = 194x$ or $y = \frac{97x}{119}$.

Substituting this value of y in the first fraction, we have $\frac{x}{\frac{97x}{119}} = \frac{119}{97}$ as the

first fraction. Hence the second fraction must be $\frac{111}{111} - \frac{1}{111} = \frac{110}{111}$. The solution explains itself. *Id.*

4. [Vol. III, No. 7, Q. 6, p. 261.]

Having bought goods for \$90.00, I sell them 4 months afterwards for \$125.00. What is the gain % per annum?

Ans. $\$125 - \$90 = \$35$; $\frac{35}{90} = 38\frac{1}{3}\%$ for 4 months; 12 months are 3 times 4 months; $\therefore 38\frac{1}{3}\% \times 3 = 116\frac{1}{3}\% = \text{gain } \%$ per annum. CORNELIUS DILLY.

5. [Vol. III, No. 8, Q. 7, p. 299.]

A tub of butter weighs 30 lbs. by a grocer's scales, but on the other scale of the balance it weighed 36 lbs. What the true weight of butter?

The weight of butter is between 30 and 36 lb.

From this it shows 30 and 36 to be the extreme terms of a geometrical series, with one term to be inserted, which will be the weight of butter. 30 and 36 extremes. No. of terms 3.

Rule: "Divide the last term by the first, and extract that root of the quotient whose index is one less than the No. of terms."

This will give common ratio.

$36 \div 30 = \sqrt[2]{1.2} = 1.0954 + \text{common ratio.}$

$30 \times 1.0954 = 32.862 + \text{lbs}$ } *Ans.* 32 lbs. 13.797 oz.
 $862 \times 16 = 13.797 \text{ oz.}$ }

J. W. ARTHUR.

Another Solution: A tub of butter weighs 30 lbs. by a grocer's scales, but on the other end of the balance it weighed 36 lbs. What the true weight of butter?

The sq. root of the product of the two numbers will solve all such questions.

$30 \times 36 = 1080 : \sqrt{1080} = 32.89 \text{ lbs.}$

C. C. FOUST, *Bu'ord, O.*

6. [Vol. III, No. 8, Q. 4, p. 299.]

A and B start together to travel to a certain town. A, who travels 20 miles per day, after traveling 8 days, turns back to where B had traveled during those 8 days. A then resumes his forward journey and they both reach the town together in 16 days from the time they started. At what rate did B travel? Full solution required.

The question above can only be solved upon one supposition, viz: That both points reached by A, at end of 8th and 16th days, are identical, which assumption makes the problem simple. A travels in a direct course 8 successive days, at 20 miles per day, or $8 \times 20 = 160$ miles in 8 days; he then turns and travels the same "course" to a certain point, where he again resumes his "forward journey" and reaches the town with B at end of 16th day. A therefore continued 8 more days on his journey back and forth. If he go 160 miles in one direction, in 8 days, it is evident that he will only travel one-half of the same distance by going over it twice (or back and forth). $\frac{1}{2}$ of $160 = 80$ miles, hence, A traveled back 80 miles; then, the same distance forward until he and B both reach "the town" at the same time. The entire distance from place of starting to destination, is 160 miles.

B, who takes up 16 days in traveling that distance, travels at the rate of $160 \div 16$, or 10 miles per day.

E. MILLER.

7. [Vol. III, No. 8, Q. 3, p. 299].

I sold 2 horses for \$810, receiving $\frac{1}{2}$ as much for the first as for the second, and gaining $33\frac{1}{3}\%$ on the first and losing $11\frac{1}{2}\%$ on the second. How much did I gain?

$$\frac{1}{2} + \frac{1}{2} = \frac{1}{2}. \quad \frac{1}{2} = \$810.$$

$$\frac{1}{2} = \$135, \text{ selling price of first horse.}$$

$$\frac{1}{2} = \$675, \text{ selling price of second horse.}$$

$$\text{Let } 100\% = \text{cost price of first horse.}$$

$$133\frac{1}{3}\% = \$135, \text{ selling price.}$$

$$1\% = \$1.01\frac{1}{4}$$

$$100\% = \$101.25, \text{ cost.}$$

$$\$135 - \$101.25 = 33.75, \text{ gain.}$$

$$\text{Let } 100\% = \text{cost of second horse.}$$

$$88\frac{1}{2}\% = \$675, \text{ selling price.}$$

$$1\% = \$7.59\frac{3}{4}$$

$$100\% = \$759.37\frac{1}{2} \text{ cost.}$$

$$\$759.37\frac{1}{2} - \$675 = 84.37\frac{1}{2}, \text{ loss.}$$

$$\$84.37\frac{1}{2}, \text{ loss, } -\$33.75, \text{ gain, } = \$50.62\frac{1}{2}, \text{ loss.}$$

WM. DRAKE, *Fitchville, O.*

8. [Vol. III, No. 8, Q. 12, p. 299.]

If the cost of an article had been 8 per cent. less, the gain would have been 10 per cent. more. What was the gain per cent?

Ans. Let 100 per cent. = cost.

$$100 \text{ per cent.} - 8 = 92. \quad 8:92 :: 10:(X). \quad 92 \times 10 \div 8 = 115. \quad 115 - 100 = 15 = \text{gain per cent.}$$

WM. W. SMITH.

9. [Vol. III, No. 8, Q. 3, p. 302].

Should I say, $2 + 3$ are 5, or is 5; $7 - 4$ are 3, or is 3?

Some use the singular when two or more numbers are added, as, "Two and three is equal to five;" but as there are two or more words connected by *and*, the plural form seems to be required, according to the following: Two or more nouns connected by *and* expressed or understood, being equivalent to a plural noun, take a plural verb; as, "James and Edward are studious."

C. C. FOUST, *Buford, O.*

NOTES.

Editors Normal Teacher:

Having traveled extensively in North Carolina, and scaled many of the highest peaks of that region, I have taken pains to acquire exact and important information concerning them. In answer to an inquiry made in your last number by X, of Lancaster, N. H., I give the names and heights of those peaks that exceed Mt. Washington in height. Mt. Mitchell (Black Dome), 6711 feet; Thunder Head, 6660; Mt. Buckley, 6599; Mt. Love, 6443; Mt. Safford, 6535; Mt. Curtis, 6568; Mt. Le Conte, 6612; Mt. Alexander, (south peak), 6299; Mt. Henry, 6373; Mt. Guyot, 6636; Roane, 6306;

Double Spring Mountain, 6380; Richland Balsam, 6425; Blackstock's Knob, 6380; Potato Top, 6393; Mt. Gibbs, 6591; Sugarloaf, 6403; Balsam Cone, 6671; Hairy Bear, 6610; Black Brother, 6619; Cattail Peak, 6611; Rocky Trail Peak, 6488; Bowlen's Pyramid, 6348. These measurements were all made by Professor Guyot. There are also twenty-nine other peaks that are less in height than Mt. Washington and yet are over 6000 feet. Comparatively few people are aware of the magnificent mountain scenery to be found in this, our "Southern Switzerland."

S. C. HANSON, Edwards Academy, Greeneville, Tenn.

Editors Normal Teacher:

Allow me to call attention to the solution of question No. 6, page 312, October number of *TEACHER*. The following I should think the correct solution: $100 \text{ per cent.} + 1\frac{1}{2} \text{ per cent.} = 101\frac{1}{2} \text{ per cent.}$ of the Amt. expended = the sum on hand, \$3126.20. Hence $\$3126.20 \div 1.015 = \3080 , Amt. expended. $\$3080 + 35 = 88 = \text{No. A. agent can buy.}$

G. H. DESH, *Supt., Allentown, Pa.*

[The above is the correct solution, of course, and ours an error, for which we have neither palliation or excuse. The many letters we have received calling our attention to and correcting it, make us hope that no one was led astray by so palpable a blunder, and lead us to feel a little flattered in spite of it, from the evident fact that our answers are so generally studied and tested. That is what we want. Watch them closely and let us hear from you.—Ebs.]

Editors Normal Teacher:

In your issue of September, Grammar Department, I noticed that in the sentence, "He esteems Sunday a day to make merry in," *to be* is disposed of as having "the construction of a noun, obj. of esteems." Now it seems to me that that is incorrect. I think a better disposition of it is to consider the whole expression,—"Sunday (to be) a day to make merry in," the object of *esteem*. *To be* simply expresses the relation of *day* to *Sunday*, and not the construction of a noun.

W. HALL.

Is $\frac{1}{10}$ A DECIMAL?

Editors Normal Teacher:

We have consulted the definitions, rules, and examples of a dozen authors, without being able to answer the above query. With the hope of more light on the subject we submit it to the readers of *THE NORMAL TEACHER*. It is not our intention to discuss the subject, *pro* or *con*, in this short article, but only to present it to our teachers.

Some mathematicians teach that all fractions having 10, or some higher power of 10 for a denominator, either written with a decimal point according to the decimal system, or with the numerator above, and the denominator below the horizontal line, are decimal fractions. On the other hand, others teach that decimals are those only that are expressed by the decimal notation. Now which theory is correct? Which shall we teach our classes? Does the decimal notation system determine decimals, as decimals, only when preceded by a decimal point, or are they decimals when expressed by both numerator and denominator? Who will explain?

E. H. DIEHL, *Sumnum, Ill.*

EDITORIAL NOTES.

SOME POINTS FOR YOUNG TEACHERS.

QUESTIONING THE CLASS.

1. Remember that every question is a link in a chain and it should be suggested by something which precedes or something which follows.
2. Compel yourself to invent your own questions, relying upon what *you* know of the subject to suggest them.
3. If you do not understand the subject well enough to ask your own questions, conscientiously review with this in view.
4. Ask your questions in the order of the development of the subject so that the answers will be its complete evolution.
5. Thus form in yourself and in the pupils the habit of discussing a subject logically. This habit of thought is worth infinitely more than the knowledge of the subject.
6. When pursuing such a train of questions, occasionally ask your pupils what question you should ask next. Those who are really *following* the discussion will anticipate the most of your questions.
7. Sometimes, after you have thus developed a train of thought, along the subject studied, by a connected series of questions, call upon some bright pupil to ask the same series of questions to the class. This will test his mastery of the subject most thoroughly.
8. This connected questioning will excite the close and *continued* attention of your class. There is inspiration in it.
9. Never permit your class to answer in concert unless you give them the word, such as "together!" When this or some equivalent sign is not given, they should understand that they must raise their hands and no one is to reply, until called upon. Enforce this strictly. *You* will be the careless one.
10. Rarely repeat a question a second time and never repeat the answer after the pupil. Either of these practices breeds inattention.
11. Let your questions be mainly to individuals, rarely to the whole class.
12. Let concert recitations be mainly of the answers first given by a pupil. Thus by repetition fix in the minds of all what has been first recited by one.

SHOP-SCHOOLS.

Industrial education is not only undemocratic, it is impracticable. Let us try it. Which trade shall we introduce? Will the carpenters be content that blacksmithing shall be taught and carpentering receive no favors? Will blacksmiths be satisfied that the schools shall be run for the benefit of the farmer? Will the farmers agree that they shall be molded to the inter-

ests of mechanics? What right has any trade, from ditching to civil engineering, that its interest should be favored at the expense of others? The only fair management will be to introduce them all, and thus the absurdity of the whole matter is reached.

But it will be urged "Nothing but the merest principles of the industries should be taught. It is not intended to convert the school-rooms into machine shops or manufactories."

So we are to teach the principles of machinery without machines, the theory of the industries without an industry, the elements of a practical art without the practice. In the name of all the formalism that is now blighting our schools, isn't there enough of this sham already? Greater folly than this we can not conceive, unless it be further urged that these principles be taught to the children by *lectures*.

But we claim that the *principles* of all trades, industries and professions are being taught in the schools now. They are Reading, Writing, Arithmetic. These have been selected from all time as the common branches, the branches which include the principles common to all the possibilities of life. Doubtless drawing should be added to these as it is in most of our city schools, and many of our country schools. The schools should be as colorless of any trade or profession as they are of religious sects. It would be just as fair to give them some denominational bias as to give them an industrial bias. Neither Methodist nor mechanic has any *special* right which the schools are bound to respect. 'Twould be as just to convert them into Sabbath Schools as into shops. The schools are not to make farmers or tradesmen, or manufacturers, or mechanics. They are to make *men*. This is their high calling. Degrade them to any lower purpose and their power is gone. The schools consecrated to the production of mechanics, will send out poor mechanics, and poorer men. There is something better than *skilled* labor. There is something better than a trained workman. It is an ambitious workman. The immense development of our America during the last century in every department of labor is proof sufficient of this. There is something better than shops, it is schools. There is something better than foremen, it is teachers.

SOUTHERN EDUCATIONAL PROBLEM.

The President of the United States and many of our exchanges are urging that the national government should in some way see to the education of the South. As yet no definite plans have been presented, but earnest grounds for the undertaking are assumed. It is urged that free schools mean free ballots. The soldier has done his work for the South, it now only remains for the teacher to do his. Public education alone can dissipate popular prejudice. Intelligence is cosmopolitan, ignorance sectional.

These are good general principles and no doubt true, every one of them, in their application to the South, or any other region, so far as that is concerned. But the attempt to carry education for the masses into the south-

ern states by the national government is a very practical question, and should be well considered by philanthropists generally.

There is a too prevalent impression among benevolent people that a good thing will go if it is only pushed hard enough. Such ideas find expression in compulsory educational laws and compulsory temperance enactments, only to be shown futile and hurtful.

England has to day a splendid national school system, backed by the moral and physical force of the crown, the government, and the combined religious and moral agencies of the whole island. Yet the statesmen and philanthropists are just beginning to discover that what the people, by reason of their social condition, do not ask for, it is impossible for the government to force upon them. Before her peasantry can be educated they must be made free. Lords and land-lords must be wiped out, and laborers, instead of being bought and sold with the land, as they now practically are, should be enabled to buy and sell the land they till, which they can not now do by any possibility. Before education can be made universal in England there must be a revolution, quiet and bloodless, perhaps, as is the English habit, but terrible and gory if necessary.

So in the southern states, before education can be popular, there must be a great revolution; a revolution which education can not effect. In the present state of feeling, any attempts upon the part of the government to establish schools or systems of schools in any of the southern states would be looked upon as a despotic invasion of a foreign power, which should be resisted the more bitterly because of its assumed beneficence. No management could avoid this difficulty.

It has been suggested that Congress appropriate money for this purpose to the different states according to the illiteracy. This would certainly be very unwise. It would be placing a premium upon illiteracy, and placing public funds at the disposal of the most unworthy and unreliable. We are disposed to think that very few northern voters would care to see treasury supplies poured through any such rat hole.

Again, we very much doubt if a bill could be gotten through Congress appropriating money to be administered by existing educational organizations of the southern states. Such a measure would run counter to decided northern prejudices, real, whether just or unjust. But we do not doubt at all that the southern states would forbid entrance into their lands to Yankee school-masters—hirelings of the national government. This would be a flagrant outrage upon all states' rights, the deepest of all southern prejudices, whether just or unjust. Southerners would not object to government money, but they would sooner be without it, than to be denied the profitable privilege of handling it themselves. We suspect that this could also be said with quite as much truth of any northern state.

It is our humble opinion that the national government has nothing to do with education in the states. If the states are too poor or too benighted to provide for the education of its masses, then they are more in need of benevolence and missionaries than they are of appropriations and government "jobbers."

THE READING REFORM.

Keep in mind that your reading classes are literature classes. There the pupils should learn by practice all the elements of Rhetoric. There they should learn to spell, to capitalize, to punctuate. There they should learn by practice to express their ideas orally and by writing with ease and force. There they should learn to appreciate beauty and force of expression. There they should learn to recognize authors by their styles. There they should learn by constant practical familiarity with good sentences, and well rounded periods, to recognize a good or a bad sentence. There they should learn good syntax, good usage of English idiom.

You need not hurry through the book. Take all the time you wish on a lesson, or a single passage of a lesson, whether it be hours, days, weeks, or months. But do not suppose because a passage is beautiful, that your pupils will be content to read it over and over monotonously. Contrive innumerable different exercises to keep them on the passage.

To this some young teacher will doubtless have reason to reply: "Yes, your recommendation is good. I would put it into practice at once, if I could. I cannot, because I have no literary culture myself. How can I, who can not use good English, teach my pupils to do so? How can I, who have no taste for good literature, arouse any in my pupils? I cannot tell a good or a bad sentence myself, how can I teach my pupils to recognize one?"

Now this is an honest confession and is just the good which the soul of many a young teacher needs. This very consciousness of your deficiency is the surety of your success if you will dare to try. Consider how by helping your pupils you may help yourself. Your level of culture, though not high, is still above that of your pupils. Bring them up and see how they will elevate you.

But THE TEACHER understands that these suggestions are too general. You want something practical. You shall have it. Let us talk about your Sixth Reader class. You have just introduced the McGuffey's Revised, a beautiful book, rich in innumerable delightful gems from the very best authors. You are determined to work a reform in your methods.

First, then, have you a Webster's Unabridged Dictionary? No. Then you can not take an independent step till you have it in your school-room. Not a word about poverty or hard times. Get this book or stop teaching. You have no right to be in a school-room if you haven't the good sense to own a Webster. Your examiners ought to make it sufficient cause to revoke your certificate. Don't wait till you get the money. Purchase the book at once. Some bookseller will be glad to trust you. Go barefoot, go hungry, go ragged, go in debt, but don't be without the Unabridged. Don't wait for your trustees. Do you suppose trustees who have no more judgment than to hire you, a teacher without a Webster, will have wisdom enough to buy one for the school? Suppose they should get one, you wouldn't know what to do with it. Get one of your own. Suffer to get it

Suffer a good deal, and you will know its value, and will use it. You will learn enough about it, too, to use it in your school-room, intelligently.

Now, THE NORMAL TEACHER will stop right here, until you report that you have bought this book. No suggestions or instructions will avail you aught if you are dictionary-less. If you haven't a clear enough apprehension of your position and its demands to purchase an Unabridged, you have not the wit to improve. You are a hopeless case. But you are not in this condition, we are certain. You simply have not thought of the importance of this matter. Now that your attention is called to it, we are confident that you will report next month that you are the owner of a Webster's Unabridged Dictionary, Latest Edition.

THE NORMAL TEACHER will conduct a class of as many of you as report having a Dictionary and McGuffey's revised Sixth. We promise simple practical work, just such as you can use in your school at once.

Will the young teachers who read this article and who conclude to purchase a Webster, please drop a postal to the editor at Lebanon, O., informing him of the fact that they have made the purchase, and have taken it to their school-rooms and are making hourly use of it? Let us form a Roll of Dictionary Honor, and swell it to heroic proportions.

DEPARTMENT OF THEORY AND PRACTICE.

BY F. P. ADAMS, PRINCIPAL CENTRAL NORMAL COLLEGE, DANVILLE, IND.

MY TRAINING CLASS.

ARITHMETIC.—III.

Case I.

Percentage: Base and rate given to find percentage.

1. What is 6 per cent. of \$948?

(1). Solution, common form.

$$\$948 \times .06 = \$56.88.$$

Now, if brevity is the only thing necessary in the solution of a problem, this is certainly *the* method. But if the development of the mind and the art of accurate thinking are the ends to be attained it is an abominable failure. In nine cases out of ten the real analysis of the process is never reached and the only reason the pupil is able to give for performing the work as he does is, "The rule says so."

Let us solve the same question by analysis, commonly known as the 100 per cent. method.

(a) Incorrect.

Let 100 per cent. = 948.

$$.01 \text{ " " } = \frac{1}{100} \text{ per cent. of } 948 = \$9.48.$$

$$.06 \text{ " " } = 6 \text{ per cent. } \times 9.48 = \$56.88.$$

The above solution is correct in general form, but any one can see at a glance that it contains many errors and should be severely criticized.

By comparing this solution with the one following, you will readily perceive the mistakes.

(b). Correct.

$$100 \text{ per cent.} = \$948.$$

$$1 \text{ per cent.} = \frac{1}{100} \text{ of } \$948 = \$9.48.$$

$$6 \text{ per cent.} = 6 \times \$9.48 = \$56.88.$$

Case II.

Base and percentage given to find rate.

1. Question: What per cent of \$821 is \$41?

(1). Solution:

(a). Ordinary method.

$$\$41 \times 100 = \$4100.$$

$$\$4100 \div \$820 = 5. \therefore \text{The rate is 5 per cent.}$$

All that can be said, either for or against the common form of solution, under Case I, can be as truly said of this.

(b). Solution by analysis, or 100 per cent.

(1). Incorrect.

$$100 \text{ per cent.} = 820.$$

$$.01 = \frac{1}{100} \text{ of } \$820 = \$8.20.$$

$$\$41 \div 8.20 = 5. \therefore \text{Rate is 5 per cent.}$$

(2). Incorrect.

$$\$820 = 100 \text{ per cent.}$$

$$1 = \frac{1}{820} \text{ of } 100 = \frac{100}{820} = \frac{10}{82}.$$

$$\$41 \times \frac{10}{82} = \frac{410}{82} = 5 \text{ per cent.}$$

(3). Correct.

$$\$820 = 100 \text{ per cent.}$$

$$\$1 = \frac{1}{820} \text{ of } 100 \text{ per cent.} = \frac{100}{820} \text{ per cent.} = \frac{10}{82} \text{ per cent.}$$

$$\$41 = 41 \times \frac{10}{82} \text{ per cent.} = \frac{410}{82} \text{ per cent.} = 5 \text{ per cent.}$$

By comparing the last solution with the first it will be seen that the difference consists in this:

The one portrays to the eye all the essential steps in the solution, so that the learner is enabled to bring the physical to the aid of the mental vision, while the other presents to view an incomprehensible absurdity which, aside from an oral demonstration, no child, unless he be a prodigy, can comprehend.

Case III.

Rate and percentage given, to find Base.

Example 1. 336 is 56 per cent. of what number?

Common solution: $336 \div .56 = 600.$

Should the pupil be called upon for an explanation, he will probably give a rule, or quote something like the following:

The base is the quotient of the percentage divided by the rate.

He has applied his method of solution, obtained the correct result and quoted the authority or rule. All this may be done, however, while he has not performed any mental analysis. Let us try the analytic or the 100 per cent. method.

Represent the required number by 100 per cent.; according to the condition in the problem, 336 is 56 per cent. Expressing these facts in mathematical language, and completing the solution we have the following:

$$100 \text{ per cent.} = \text{the required number or Base.}$$

$$56 \text{ per cent.} = 336.$$

$$1 \text{ per cent.} = \frac{1}{56} \text{ of } 336 = 6.$$

$$100 \text{ per cent.} = 6 \times 100 = 600.$$

Example 2. I lost \$6, which was $13\frac{1}{2}$ per cent. of what I had; how much did I have?

Solution:

$$100 \text{ per cent.} = \text{the amount.}$$

$$13\frac{1}{2} \text{ per cent.} = \$6.$$

$$1 \text{ per cent.} = \$6 \div 13\frac{1}{2} = \$.45.$$

$$100 \text{ per cent.} = \$.45 \times 100 = \$45.$$

Example 3. William is 16 years old and $37\frac{1}{2}$ per cent of his age is 40 per cent. of Richard's age. How old is Richard?

1. To find $37\frac{1}{2}$ per cent. of William's age.

$$100 \text{ per cent.} = 16 \text{ years.}$$

$$1 \text{ per cent.} = \frac{1}{100} \text{ of } 16 \text{ yrs.} = .16 \text{ yrs.}$$

$$37\frac{1}{2} \text{ per cent.} = .16 \text{ yrs.} \times 37\frac{1}{2} = 6 \text{ yrs.}$$

2. To find Richard's age.

According to the second condition in the problem, $37\frac{1}{2}$ per cent. of William's age (—6 yrs.) is 40 per cent. of Richard's; representing the latter by 100 per cent. and proceeding, we have the following:

$$100 \text{ per cent.} = \text{Richard's age.}$$

$$40 \text{ per cent.} = 6 \text{ yrs.}$$

$$1 \text{ per cent.} = \frac{1}{40} \text{ of } 6 \text{ yrs.} = \frac{3}{20} \text{ yrs.}$$

$$100 \text{ per cent.} = \frac{3}{20} \text{ yrs.} \times 100 = 15 \text{ yrs.}$$

Case IV.

Amount or Difference and Rate given, to find Base.

Example 1. In a school, 5 per cent. of the pupils are always absent, and the attendance is 570; how many are enrolled?

Common solution.

$$570 \div 1 - .05 = 600.$$

The rule or principle employed in this method is, in substance, as follows:

The base equals the quotient of the difference divided by 1 minus the rate.

Let us apply the 100 per cent. method; remembering that the number enrolled minus the number absent—the number present, we have

100 per cent.—number enrolled.
 100 per cent.—5 per cent.—95 per cent.—570.
 1 per cent.—6.

100 per cent.—600.

Example 2. A merchant sold 51 yards from a roll of carpeting, and the amount sold was $37\frac{1}{2}$ per cent. of the whole number of yards in the roll; how many yards were in the roll?

100 per cent.—number.

$37\frac{1}{2}$ per cent.—51 yards.

1 per cent.—51 yards $\div 37\frac{1}{2}$ — $1\frac{1}{3}$ yards.

100 per cent.— $1\frac{1}{3}$ yards $\times 100$ —136 yards.

GRAMMAR DEPARTMENT.

PARSINGS OF EXAMPLES IN SYNTAX.

TEST WORDS IN SYNTAX.

BY A. HOLBROOK, PRINCIPAL OF NATIONAL NORMAL SCHOOL, LEBANON, O.

1. When buttress and buttress alternately
 Seemed (1) *framed* of ebon and of ivory,
 Where distant Tweed is heard (2) *to rave*.—*Scott*.
2. To Adversity,
 (3) *Scared*, at thy frown terrific fly
 Self pleasing folly's idle brood,
 And leave us leisure (4) *to be* (5) *men*.—*Gray*.
3. (6) *To be* no more; sad (7) *curse*;
 For who would lose this intellectual being?—*Young*.
4. He ordered his helpless (8) *victim* (9) *brought* before him.—*Translation of Cicero, vs. Verres*.
5. (10) *Drest* in a little brief authority
 Most ignorant of (11) *what* he's most (12) *assured*,
 Plays such fantastic tricks before high heaven,
 (13) *As make* (14) *angels* (15) *weep*.—*Shakespeare*.
6. He ignores the fact which he was most anxious (16) *to have considered*.
7. Had (17) *it* not been for Dryden, we never should have had a Pope.
 —*Goldsmith*.
8. (18) *It* seems as if we Britons were ordained
 To fear each (19) [*person*] other, (20) [*person*] fearing none beside;
 In other eyes our talents rarely (21) *shown*,
 Become at length so splendid in our own,
 We dare not risk them unto public view
 Lest they miscarry of (22) *what* seems their due.—*Cowper*.

THE RULES AND ARTICLES REFERRED TO ARE IN HOLBROOK'S COMPLETE GRAMMAR.

(1) *Framed*, participle, passive, past, having the construction of an adjective in the predicate with 'seemed' and limits 'buttress and buttress.' R. 20 and 1.

(2) *To Rave*, infinitive active, present, having the construction of an adverb of manner limiting 'is heard,' R. 20 and 2.

(3) *Scared*, part., pass., past, with the construction of an adverb of cause, limiting 'fly,' R. 20 and 2.

(4) *To be*, infinitive, act, pres. with construction of an adverb of purpose limiting 'leave,' R. 20 and 2.

(6) *To be*, construction of a noun, absolute by exclamation, R. 20 and 22

(7) *Curse*, nom. by apposition with 'to be,' R. 13. Art 194, and 1. (d).

(8) *Victim*, noun, 3d, sing., mas., objective, the subject of '[to be]brought,' R. 16.

(9) '*Brought*,' infinitive, pass., present, with construction of a noun, the object of 'ordered.' The sign *to* is omitted, R. 21. The auxiliary *be* is suppressed. Art 917.

(10) *Drest*, part., past, with construction of an adjective limiting 'he,' R. 20 and 1.

(10) Second reading. Most ignorant of *things* [of] *which* he is most assured.

(11) *What*, pronoun, relative double, equivalent to *things which*.

(11) *Things*, the relative, part. object of 'of.' R. 18.

(11) *Which*, the relative part. pronoun, relative; its antecedent, 'things,' with which it agrees in 3d, plural, R. 5, object of 'of' understood. R. 18.

(12) *Assured*, adjective, descriptive, in the predicate with 'is,' limiting its subject 'he,' R. 1.

(13) *As*, pron., rel., ant., tricks, nom. subject of 'make.' R. 15.

(14) *Angels*, objective, subject of 'weep,' R. 16.

(15) *Weep*, infinitive, active, present, with construction of a noun, object of 'make.' R. 20 and 17.

6. Second Reading. He ignores the fact which he was anxious to to have [to be] *considered*.

(16) *To have*, inf., act., pres., construction of an adverb of purpose limiting 'anxious,' R. 20 and 2.

(16) *Considered*, inf., pass., pres., with construction of a noun, object of 'to have.' R. 20 and 17.

Sign *to* is omitted, R. 21; auxiliary '*be*.' Art 917.

7. Second reading. Had it not been for Dryden [to have written] we should never have known a Pope.

7. Third reading. [If] for Dryden [to have written] had not been, we should never have known a Pope.

(17) *It*, pron., personal, ant. the phrase 'for Dryden [to have written]', with it agrees in 3d, sing., neut. Art 764. nom by expletion being the grammatical subject of 'had been'; whereas the logical subject is the antecedent for Dryden to have written, as shown in the third reading.

EXAMINATION DEPARTMENT.

QUESTIONS PREPARED BY THE INDIANA STATE BOARD OF EDUCATION, FOR THE EXAMINATION OF TEACHERS IN OCTOBER, 1880.

WRITING.

1. How do you teach pupils to hold the pen? 10.
2. What is a left curve in writing? 10.
3. Is there any difference between a space in height and a space in width of the small letters? If so, what is it? 2 pts., 5 each.
4. Analyze the small *w* according to your method of teaching. 10.
5. Give a general classification of the capital letters. 10.

Write this couplet as a specimen of your writing:—

“ Guide well the pen, its magic touch can fling
The gems of knowledge from the mind's plum'd wing.”

1 to 50.

Let the penmanship of the candidate as shown in the answers to the above questions be marked from 1 to 50 according to the judgment of the Superintendent.

SPELLING.

1. What five different letters or combinations of letters may be used to represent the sound of *u* in *burn*? 10.
2. Give the rule for doubling the final consonant of a word on receiving a suffix beginning with a vowel. Illustrate each part of the rule. 10.
3. Of what value is the spelling-book as a text book in schools? 10.
4. Indicate the sounds of the following letters by use of the proper diacritical marks:—*Height*; *isle*; *people*; *guard*; *gaol*. 10.
5. Spell 20 words pronounced by the examiner. 60.

READING.

1. To what extent should pupils learn to read by imitation? 10.
2. State the reasons for requiring every pupil to be able to pronounce every word in the sentence or paragraph at sight, before he is called upon to read it. 10.
3. What is the general principle by which we determine where the emphasis shall be placed in reading? 10.
4. Make out a list of questions which might be written upon the black-board to aid the pupil in the preparation of the following reading lesson:—

THE OLD CLOCK ON THE STAIR.

Somewhat back from the village street
Stands the old-fashioned country-seat;
Across its antique portico

Tall poplar trees their shadows throw;
 And from its station in the hall,
 An ancient time-piece says to all:—
 "Forever—never!
 Never—forever!"

Half way up the stairs it stands,
 And points and beckons with its hands;
 From its case of massive oak,
 Like a Monk, who, under his cloak,
 Crosses himself, and sighs,—alas!
 With sorrowful voice to all who pass!
 "Forever—never!
 Never—forever!"

10.

5. State in your own words the thought expressed in the second stanza. 10.

6. The candidate should read a selection, upon which he may be graded from 1 to 50.

ARITHMETIC.

1. Are the following correct? If not, give the reason.

$$4 \text{ ft.} \times 4 \text{ ft.} = 16 \text{ sq. ft.}$$

$$4 \text{ bu.} \times 4 = 16 \text{ pecks.}$$

$$\$400 \times 4 \text{ c.} = \$16.$$

$$4 \text{ bbl.} \times \$4 = \$16.$$

8 pts., 2 off each.

2. Divide L. C. M. of 9, 15, 21, 35, 63, 72, and 280 by G. C. D. of 805 and 2079. L. C. M., 3; G. C. D., 4; Ans., 3.

3. Represent the following by appropriate diagrams: (1) a square; (2) a rectangular solid; (3) a square pyramid; and (4) a cylinder.

4 pts., 3 off each.

4. How many pump logs, each 12 ft. long, will it take to bring water to my house from a spring 1.375 miles distant? Proc., 5; Ans., 5.

5. How many loads of sand at $\$ \frac{5}{8}$ a load, will pay for $290 \frac{3}{4}$ yds. of cloth at $\$ \frac{1}{16}$ a yard? Proc., 5; Ans., 5.

6. If one gram of quinine cost \$.0535, what will one kilogram cost?

Proc., 5; Ans., 5.

7. An orchard containing 7.5 acres is 6 per cent. of the whole farm on which it is situated. How many acres in the farm? Proc., 5; Ans., 5.

8. What principal in 1 yr. 11 mos. 18 da., at 5 per cent. per annum will produce \$41.28 interest? Proc., 5; Ans., 5.

9. A and B together can do a piece of work in 15 da.; A and C in 12 da.; B and C in 8 da. How many days will it take all together to do it?

Proc., 5; Ans., 5.

10. Prove that the sum of an arithmetical series is equal to the sum of the extremes multiplied by one half the number of terms. 10 or 0.

GRAMMAR.

1. Correct:—We must respect such as him. Parse *as*. 2 pts., 5 each.
2. Punctuate:—Although we seldom follow advice we are all ready enough to ask it. 10.
3. "Why do you mark me so low?" will be asked by many an applicant. Parse *low* and *asked*. 2 pts., 5 each.
4. Analyze the above sentence. 10.
5. Conjugate the verb *must* in all its moods and tenses. 10.
6. Give the corresponding masculine or feminine forms of the following nouns:—maid, niece, youth, roe, monk. 5 pts., 2 each.
7. Write a sentence containing an infinitive and its object, depending on a participle. 10.
8. He that lacks time to mourn lacks time to mend. Parse *he* and *that*. 2 pts., 5 each.
9. In the above sentence parse *mourn* and *lacks* in the dependent clause. 2 pts., 5 each.
10. Correct:—Each one of the vowels represent several sounds. There is sometimes more than one auxiliary to the verb. 2 pts., 5 each.

GEOGRAPHY.

1. Give three proofs of the interior heat of the earth. 3 pts., 4 off for each one.
2. Why is the polar diameter of the earth shorter than its equatorial diameter? How much shorter is it? 2 pts., 5 each.
3. What causes the saltness of the ocean? 10.
4. What portion of the territory of the United States lies north of the Arctic circle? 10.
5. What distinguishes a barbarous nation from a civilized one? 10.
6. Name three cities of Indiana, located on rivers, and tell for what each city is noted. 3 pts., 4 off for each one.
7. What effect have Lakes Huron and Michigan upon the climate of the southern peninsula of Michigan? How is this shown? 2 pts., 5 each.
8. On which side of S. America are the longest rivers? Why? 2 pts., 5 each.
9. What is the peculiarity of the surface of Holland? How is it largely protected? 2 pts., 5 each.
10. Draw a diagram of a township as laid out by the United States, and locate the S. E. $\frac{1}{4}$, S. W. $\frac{1}{4}$ Sec. 18. 10.

HISTORY.

- I. Name the uses of history. 4 for 1 pt., 7 for 2, 10 for 3.
2. Tell the story of the attack on Fort Sumpter, 1861. 10.
3. Name five principal generals of the civil war, in the armies of the confederacy. 5 pts., 2 each.

4. (a) What was the Dred Scott decision, 1857? (b) By whom was it delivered? a, 8; b, 2.
5. (a) Who was the first Republican President? (b) In what year was he inaugurated? 2 pts., 5 each
6. What was the "Know Nothing" party, 1856? 10.
7. (a) On what conditions was California admitted into the Union? (b) In what year? a, 7; b, 3.
8. What two great events occurred in Polk's administration? 2 pts., 5 each.
9. What was President Jackson's action toward the U. S. bank? 10.
10. What is the best method of teaching history? 10.

NOTE.—Descriptions and narratives not to exceed six lines each.

PHYSIOLOGY.

1. Name three uses of the bones. 3 pts., 4 off of each.
2. How does nature provide for the repair of a broken bone? 10.
3. How many sea-baths can be taken daily with safety? How many fresh-water baths? Give reasons for answers. 3, 3, 4.
4. Name five classes of food from which albumen is obtained. 5 pts., 2 each.
5. What is the advantage of keeping meats for some time after the animals are killed? What the disadvantage of keeping them too long? 2 pts., 5 each.
6. Why do a dry mouth and a parched tongue show that the stomach is unable to carry on digestion? 10.
7. What were the causes which produced the death of those persons confined in the Black Hole of Calcutta? 3 pts., 4 off for each.
8. Why are the nervous centres of the senses and the vital organs located where they are?
9. What effect upon the sense of taste is produced by closing the nose and eyes, when taking anything into the mouth? 10.
10. What are the objections to frequent washings of the ear tubes in cold water? 10.

THEORY AND PRACTICE.

Write a page or more on punishment, stating its objects and methods, the spirit in which it should be administered, etc. State also your views on corporal punishment.

NOTE.—The paper written by the applicant should be marked on a scale of 1 to 100. The number, value and correctness of the statements made should be considered.

He has the largest life who lives in the lives of the largest number.

CONSTANT success shows us but one side of the world; for it surrounds us with flatterers who will tell us only our merits, and silences our enemies from whom alone we might learn our defects.

ANSWERS TO STATE BOARD QUESTIONS FOR OCTOBER, 1880.

IN SPECIAL CHARGE OF ANNIE M. SHERRILL.

The Number of the Answer Corresponds to the Number of the Question.

WRITING.

1. The pen should be held between the thumb and first and second fingers, the holder crossing the first finger just forward of the knuckle-joint. The pen should cross the root of the nail of the second finger. The end of the thumb should press upon the holder opposite the first joint of the first finger. The third and fourth fingers should curve under and separate from the others at the middle joint and rest upon the paper at the tips of the nails.

2. A left curve is the left side of an oval figure. It is the third principle of letters.

3. A space in height is equal to the height of the small letter *i* without the dot. A space in width is equal to the space between the two slanting lines of the letter *u*.

4. Beginning on the ruled line it extends upward with a right curve one space where it is jointed angularly to a slanting straight line which descends to the ruled line, uniting in a turn with a second right curve which extends upward one space and unites angularly to a slanting straight line which descends to the ruled line where it is united in a turn with a third right curve extending upward one space a half a space nearer the straight line than the second right curve is to the first straight line. The letter terminates with a right curve in a horizontal position one half space in length.

5. The full O, the contracted O, the capital loop, and capital stem.

SPELLING.

2. Words accented on the last syllable, ending in a single consonant which is preceded by a single vowel, double the final letter on taking an additional syllable beginning with a vowel. Example: compel, compelling.

3. The spelling book is not of so much importance as a text book in schools as other books yet it should not be ignored. Spelling should be taught to a considerable extent from the reading books where words occur in their connection. A dictionary should be used also in selecting spelling lessons.

READING.

1. It is not desirable that pupils learn to read to any great extent by imitating a teacher. The principles of Elocution should be taught as soon

and as far as possible and the pupil should learn to read by applying the principle in connection with hearing a teacher.

2. If the pupil be able to pronounce every word in the paragraph he will read it without hesitation and consequently much better than otherwise.

3. We should determine in a general way where emphasis should be placed by the meaning of the sentence.

4. Where does the country seat here described stand?

The meaning of antique, portico, Monk? What says "forever—never" &c.? Who is the author of these verses? What form, quality, force, stress, pitch and movement should be used in reading the piece?

5. The old clock in its case of oak seems like a Monk standing half way up the stairs, crossing himself under his cloak and saying with a sigh "Forever—never, never—forever."

ARITHMETIC.

1. The first statement is incorrect because feet cannot be multiplied by feet. $4 \text{ bu.} \times 4 \text{ might} = 16 \text{ pks.}$, and it might = bu. according to the connection. The remaining statements are incorrect for the reason that dollars cannot be multiplied by cents, nor bbl. by dollars.

2. L. C. M. of 9, 15, 21, 35, 63, 72, $280 = 2520$. G. C. D. of 805, $2079 = 7$
 $2520 \div 7 = 360$.

4. $5280 \times 1.375 = 7260 = \text{no ft. in distance from spring to house.}$
 $7260 \div 12 = 605 = \text{no. logs required.}$

5. $290 \frac{3}{4} = 290 \frac{6}{8} = 290 \frac{3}{4} \times \frac{1}{16} \times \frac{1}{8} = 62 = \text{no. loads of sand req.}$

6. 1 Kilogram = 1000 grams.

If 1 gram cost \$.0535, 1 Kil. will cost $$.0535 \times 1000 = \53.35 .

7. If 7.5 A is 6 per cent. of the farm, 1 per cent. is $\frac{1}{6}$ of 7.5 A. $= \frac{5}{8} \text{ A}$
 And 100 per cent. or the entire farm $= \frac{5}{8} \text{ A} \times 100 = 62 \frac{1}{2} = 125 \text{ A.}$

8. \$.05 = \text{Int. of } \\$1 \text{ for 1 yr.}

$.04 \frac{1}{18} = \text{" " " " 11 mon.}$

$.00 \frac{1}{4} = \text{" " " " 18 da.}$

$\$09 \frac{1}{2} = \text{Total int.}$

$\$41.28 + 09 \frac{1}{2} = \$419 \frac{1}{2} = \text{Prin. req.}$

9. If A and B can do it in 15 da., in 1 da. they can $\frac{1}{15}$ of it.

If A and C can do it in 12 da., in 1 da. they can do $\frac{1}{12}$ of it.

If B and C can do it in 8 da., in 1 da. they can do $\frac{1}{8}$ of it.

From this it is seen that

A and B can do $\frac{1}{15}$ in 1 da.

A and C " " $\frac{1}{12}$ " 1 da.

B and C " " $\frac{1}{8}$ " 1 da.

Hence by addition

2 A and 2 B and 2 C can in 1 day do $\frac{1}{15} + \frac{1}{12} + \frac{1}{8} = \frac{8}{120}$ of the work in 1 da. and A, B and C can in 1 da. do $\frac{1}{2}$ of $\frac{8}{120}$ of the work which is $\frac{4}{15}$ of it.

If A, B and C can do $\frac{3}{4}$ of the work in 1 da. and A and B can do $\frac{1}{2}$ of it, C must in 1 da. do the difference between $\frac{3}{4}$ and $\frac{1}{2}$ which is $\frac{1}{4}$ of the work. If C can do $\frac{1}{4}$ in 1 da. to do $\frac{3}{4}$ of the work will require as many days as $\frac{1}{4}$ is contained times in $\frac{3}{4}$, which are 3 times. Hence, C will require 3 da. If A, B and C can do $\frac{3}{4}$ of the work in 1 da. and A and C can do $\frac{1}{2}$, B can do the dif. which is $\frac{1}{4}$ of the work in 1 da. Hence he can do the whole work in 4 da.

If A, B and C can do $\frac{3}{4}$ in 1 da. and B and C can do $\frac{1}{2}$, A must do the dif. which $\frac{1}{4}$ in 1 da. Hence A can do the whole work in 4 da.

If A, B and C can do $\frac{3}{4}$ of the work in one da., to do $\frac{3}{4}$ will require as many days as $\frac{3}{4}$ are contained times in $\frac{3}{4}$ = 1 da.

Therefore, it will require 4 da. for A, B and C to do the work.

10. Let 2, 6, 10, 14, 18 = the terms of a series. Their sum is 50. Half the sum of the extremes = $2 + 18 = 20$. Half the number of terms is $2 \times 2 = 4$.

GRAMMAR.

1. We must respect such [a person] as he.

As, pro., rel., agrees with its ant. person, in 3d, sing., mas. Nom. case in the pred. with *is*, referring to the same as the sub. *he*.

2. Although we seldom follow advice, we are all ready to ask it.

3. Why do you mark me [for me to be] so low? will enough be asked by many an applicant.

Low, an adj., des., limits me, understood.

Will be asked, verb, reg., trans., passive, indicative mode, future tense, 3d, sing., to agree with sub., the sentence, *why do you mark*, &c.

4. The above is a complex, declarative sentence of which *why do you mark me [for me to be] so low* is the simple subject unmodified, and also a simple interrogative sentence of which *you* is the simple subject, unmodified, and *do mark me [for me to be] so low* is the complex pred., of which *do mark* is the simple pred., modified by *me*, a simple objective of the first class, also by [for me to be] so low a complex adv. ele. of second class, of which to be so low is the base, of which *to be*, the copula, is modified by *me* a simple subjective element of the first class. Low, the attribute, is mod., by *so*, a simple adv. ele. of first class. Of the leading sentence, will be asked by *many an applicant*, is the complex pred., of which will be asked is the simple pred., modified by *by many an applicant*, a complex adverbial element of the second class, of which *applicant*, the noun of the base, is modified by *many an*, which may be considered together as a simple adj. element of the first class.

5. Must is not a verb, but only an *auxiliary*.

6. Bachelor; nephew; hart, stag, or buck; Nun.

7. I am now tired of having to make amends for my mis-step.

8. *He*, pro., personal, agrees with ant., person spoken of, in 3d., sing., mas., nom. case, subject of lacks. That, pro., rel., agrees with ant. *he* in person, number and gender, nom. case. sub. of lacks.

9. Mourn, verb, reg., intrans., active, infin. mode, construction of an adj., limits *time*. Lacks, verb, reg., trans., active indicative, 3d., sing., to agree with sub. *that*.

10. Each one of the vowels represents several sounds. There are some times more than one auxiliary.

GEOGRAPHY.

1. (a) Volcanoes. (b) Geysers and Hot Springs (c). The heat increases in proportion to the depth as shown in deep mines and borings as Artesian wells.

2. When the earth was in a plastic condition the equatorial parts of the earth would bulge out by centrifugal force when in rotation. The polar diameter is about 26 miles shorter than the equatorial diameter.

3. Salt is soluble in water. Salt forms a portion of the solid mass of the earth. As the ocean receives the drainage from the land the salt would be carried into it and not being returned by evaporation it retains its saltiness.

4. About one third of the territory of Alaska.

5. The lack of education, which implies a lack of a written language, of machines for lessening labor and adding to human comfort, of good government, of morality, of benevolence and of Christianity.

6. (a) Indianapolis, the capital and largest city, situated on White River, noted as the greatest railroad center in the U. S. (b) Evansville, the second city, located on the Ohio River, is noted for its commerce in agricultural products, lime, cement and salt, and for its manufactures. (c) New Albany, on the Ohio River, is largely engaged in pork packing and has the most extensive glass works in the U. S.

7. These lakes modify the climate of the Southern Peninsula rendering it mild in winter and cool in summer. This is shown by its great production of peaches and grapes which are here cultivated farther north than anywhere in the U. S., east of the Mississippi.

8. The longest rivers of South America are on the eastern side because the Andes mountains being the water shed, are near the western border.

9. Much of the surface of Holland is below the level of the ocean. It is largely protected by embankments of earth called dykes.

10. By the diagram may be seen the position of section 18. Draw lines across the center east and west and north and south dividing it into four equal parts. The southwest part will be the "S. W. $\frac{1}{4}$ Sec. 18." Divide this square in the same manner into four equal parts and the southeast part will be "S. E. $\frac{1}{4}$, S. W. $\frac{1}{4}$, Sec. 18"

6	90	68	51	34	17
88	5	4	3	2	1
	89	67	50	33	16
	86	87	65	66	48
7	8	9	10	11	12
84	85	64	47	30	13
	82	83	62	63	45
18	17	16	15	14	13
80	81	61	44	27	10
	78	79	59	60	42
19	20	21	22	23	24
76	77	58	41	24	7
	74	75	56	57	39
30	29	28	27	26	25
72	73	55	38	21	4
	70	71	53	54	36
31	32	33	34	35	36
	69	52	35	18	1

HISTORY.

1. As contributing to the enlargement of the mind by furnishing a store of knowledge. 2. As a stimulus to education and morality by comparison of the acts of different individuals as affecting their welfare and happiness. 3. As a stimulus to patriotism and good government when the career of nations is studied as affecting the general prosperity of the people.

2. Hostilities began at Ft. Sumpter, in Charleston harbor. It was garrisoned by Major Anderson with 80 men, its supplies being nearly exhausted, the President resolved to provision it. The Confederates demanded its surrender. This being refused, it was bombarded from the city for 34 hours. His men being exhausted, his quarters on fire, and his ammunition nearly gone, Anderson surrendered the fort. These events occurred April 12 and 13, 1861. *Taylor's Model School Hist. U. S.*

3. Robt. E. Lee, Stonewall Jackson, Joseph E. Johnston, Albert Sidney Johnston, Braxton Bragg.

4. This decision, which was delivered by Chief Justice Taney, declared the Missouri Compromise unconstitutional, that the Constitution gave slave-owners the right to hold their slaves in the territories, and that neither negro slaves nor their descendants, slave or free, could become citizens of the U. S. *School History of U. S., Campbell.*

5. Abraham Lincoln inaugurated March 4, 1861.
6. The Americans or "Know Nothing" party organized in 1856 was opposed to foreign and especially Roman Catholic influence in legislation and ignored entirely the slavery question which then was becoming the leading issue in politics.
7. The admission of California on the condition that it should be a free state was one of the provisions of the Omnibus Bill which was passed Sept. 1850.
8. The Mexican War with the Annexation of Texas and the discovery of gold in California.
9. Pres. Jackson vetoed a bill to renew the charter of the U. S. Bank.
10. History is best taught by means of topics together with written reports and essays upon historical subjects.

PHYSIOLOGY.

1. To protect the delicate organs. 2. To act as levers for the attachment of muscles the actions of which produce motion. 3. To furnish a framework for the body.
2. By throwing out material which unites the severed portions.
3. Bathing either in salt or fresh water should not be carried to excess as it exhausts the system by causing too great a relaxation of tissues. We will not pretend to give the number of baths which a person may take with safety as different individuals have different powers of endurance.
4. Albumen can be obtained from eggs, flesh of animals, cheese or milk, beans, peas and other leguminous plants and from wheat, corn and other cereals.
5. We see no advantage in keeping meats after the animal has been killed. As soon as the animal heat has left the body decomposition begins though it may not be perceptible to the senses for some time. Meat that has commenced the process of decomposition is unfit for food. Meats preserved by salt or by drying are less easily digested than fresh meats because deprived of juices which render their solution in the stomach easier.
6. The condition of the mouth and tongue indicate the condition of the walls of the stomach and intestines because all are lined with the same mucous membrane. When the mucous membrane fails to secrete its normal amount of mucus it is in an unhealthy condition.
7. The persons in the Black Hole of Calcutta died from the combined effects of the want of oxygen and the suffocating effects of carbonic anhydride produced by the breathing of so many persons.
8. They are better protected from injury there than in any other part.
9. The sensations of taste are largely connected with those of other senses, such as smell, touch and even sight. Thus, when the nose is held tightly closed so as to obtain no smell, the taste of many a substance is

rendered difficult to distinguish; and it is very nearly the same if the sense of sight is interfered with. *First Lessons in Physiology, C. L. Hotze.*

10. Cold water tends to paralyze the nerves and thus reduce the sensibility of the parts.

THEORY AND PRACTICE.

The aims of punishment should be, first, to reform the offender, second to maintain discipline by warning others from committing similar offences. The teacher should never attempt to inflict punishment when in a state of anger or excitement. The necessity of punishment should be of rare occurrence. The teacher should endeavor by every means in his power to keep pupils employed so that they will have no time or inclination for mischief. Little offences should be noted at once and not allowed to accumulate one leading on to another until punishment is necessary to maintain the order necessary to carry on the operations of the school. The cases where corporal punishment is admissible are very few indeed. It should only be as a last resort and even then the teacher admits his weakness and inability when compelled to resort to it.

COLLEGE DEPARTMENT.

DEVOTED TO THE INTERESTS OF THE CENTRAL NORMAL,
DANVILLE, INDIANA.

CONDUCTED BY G. DALLAS LIND.

DEAR FRIENDS:—Again we greet you and have plenty of news to tell you. We must take the bitter with the sweet and along with the good news from Normalites comes the sad intelligence of the deaths of three of our number, Miss Maggie Nelson, Miss Effie Thomas and E. Smith Dean, three most excellent fellow workers who have left this stage of action for, we hope, a wider field of work. Many of you will remember them as students here.

The second term of the year opened up larger than any previous corresponding term. We heartily congratulate you all on the fact that our school is a remarkable success. What more can we say about it? We know that all who have been with us and have not completed a regular course will come back if circumstances will permit. New students are coming all the time and we can only wonder where they all come from but we do not wonder why they come, for doesn't everybody who has been here say that the Central Normal has superior facilities.

A pile of letters lies before us. Let us have a "Reunion" of old Normalities on paper. By the way, that reminds us of the delightful Reunion we did have, conducted entirely by Normalites who are teaching in

the vicinity of Danville. It was a grand success. Among the old familiar faces who reappeared on this happy occasion we recall those of C. W. Bone, G. W. Brill, Theo. Miller, Huldah Sanders, Mollie Mitchell, C. A. McClure, Jennie Rand, M. F. Orear and G. W. Payton.

And now for those letters and first we have one from J. Walter Fertig. He is teaching at Romney, Ind., and is having a very successful school, of course, because he is running it on Normal principles and his pupils are inspired with the Normal idea of work. He says, "we elect a Secretary every week to keep the minutes of each day. This is read every morning. I find it a preventive of tardiness."

Thomas W. Thomson is principal of a graded school at New Harmony, Ind., says, "the children here take hold of Normal Methods."

Miss Etta Pentecost is teaching at Alexandria, Ind., and succeeding.

Miss Maggie Dancer writes from South Milford, Ind. and Says, "My eyes are ever so much better now and I think that I may go back to the Normal this winter or next spring."

Miss Nellie Emerick is teaching near Arcadia, Ill. Hopes to come back to the Normal.

Alonzo Leachman and wife are teaching at Tuscola, Ill.

Thomas Riner is teaching at Greenbush, Ohio. He says, "I want to tell you of my success in teaching which I attribute in a great measure to my work and the instruction and advice I received at the Normal."

W. H. Wilson writes from Whitestown, Ind., to Prof. Adams saying, "As Maggie Cory says, 'O, how I long to be with you in your grammar class.'"

Lee Tilman is teach a school composed entirely of German children at Haysville, Ind. He says the instruction received at the Normal has been of inestimable benefit to him.

We cite the following from a local paper: "Mr. Z. T. Dungan now ranks as an attorney, having been admitted to the bar last Saturday. Mr. D. who has always ranked as one of the best of school teachers, has a bright prospect before him, being a hard student and a fluent speaker, and will undoubtedly meet with success in his new field of labor."

"*Hours of Recreation*" is the title of a humorous and pathetic magazine edited and published by an old Normalite, T. S. Denison. He is the author of a number of dramas for school and home exhibitions. His address is No. 70, Metropolitan Block, Chicago, Ill.

Prof. G. Walter Dale, Elocutionist, has just completed a course of seven lectures here. We are happy to announce that he has been employed as a regular instructor in Elocution during Spring and Summer terms. As an Elocutionist and teacher of Elocution Prof. Dale has few equals in the West. See advertisement of his book on another page.

D. C. Searles is teaching at Mt. Etna, Ind.

J. M. Stallworth writes from New Washington, Ind. He says, "I am engaged in teaching my third term in my old home district at an increased salary. I have a splendid school and love to teach. The Normal is as

dear to me as ever. When I receive THE NORMAL TEACHER the first place I look for is the College Department. I will be with you at the close of the term. Have the promise of quite a number from old Clark."

T. J. George is teaching at Leopold, Ind.

Abraham Halleck writes from Albion, Ind., and says "I regret that I cannot be with you. Give my best wishes to the classics and look for me next year.

E. W. Johnson is teaching at Grayville, Ill.

J. B. Young is in the Hardware business at Petersburg, Ind. He wishes the Normal "abundant success" and hopes to visit us this winter. Many of you will remember the pleasant musical and jocular "young" man of last winter.

Myra Frenyear, one of the "J. O. M's." (some will understand) is teaching successfully at Lizton, Ind.

R. Alice Nichols is teaching at Economy, Ind.

Miss Dollie Bunting, and Miss Mary Willis and her brother Maurice are all teaching in the neighborhood of Albion, Ill.

James T. Sheedy writes from Scipio, Ind., saying, "I have opened my school under very favorable circumstances. I feel the benefit of my stay at the Normal."

D. C. Shields teaching at Crothersville, Ind.

Just as this goes to press a card from M. L. Wagner says, "Am engaged in teaching, have a good school and think I am doing good work. Feel well repaid for time spent in Central Normal. I have made a change in my manner of living and believe it to be a *Normal* change. I was married to Ella V. Jones, Nov. 11." * * * "I still think of coming back to take the Classic course." He is at East Germantown, Ind.

NATIONAL NORMAL DEPARTMENT.

DEVOTED TO THE INTERESTS OF THE NATIONAL NORMAL SCHOOL, LEBANON, WARREN CO., O.

DEAR NORMALITES AND OTHER FRIENDS:—It is vacation. That is, our First Term closed last Thursday and our Second Term opens to-morrow, Tuesday. If the hearty enthusiasm with which the pupils called forth, received and applauded remarks from the teachers at our last Gen. Ex. is any indication, the work of the term was satisfactory, successful and gratefully appreciated by pupils and teachers. It was a regular love feast. First called out was J. B. Holbrook. He always is, that is, he is always first

called out. He remarked that the pupils, with very few exceptions, had worked when work was the thing and played when play was the thing. A few who had shown that they loved work not the less but play the more, did so, he thought, because they couldn't help it. They reminded him of a man who had a very obstinate wife. A neighbor, accosting him, asked why he was like a donkey. Of course he gave it up. "Well," said the neighbor, "it is because your better half is stubbornness its self." He thought that a good joke and returning home concluded he would give his wife the benefit of it. "Wife," said he, "why am I like a donkey?" Instead of casting about for an answer or hesitating in the least, the good lady responded, "I don't know, George, unless it is because you were born so." So it might be with these playful Normalites. They may have been born so.

Next Mr. Schmitz. After complimenting the folks upon their good work and expressing his own enjoyment of it, informed them that he would give grades during the day and for those who came *with a case* to consult him about their grades he would carefully leave in his room, Mr. Moore, his room-mate, upon whom they might bestow all the impressions they might wish to make upon him.

Mr. Heber bestowed a deserved compliment upon the Scientifics for the zeal and faithfulness with which they had maintained themselves during the whole term, and especially during the last week when the "finals" added greatly to their already numerous and exacting duties.

Mrs. Smith responded warmly and paid her pupils many sincere compliments.

Miss Irene maintained that all that had been or could be said in praise of the Scientifics and other classes could be repeated with enlargements and additions for the benefit of the classes and then they would not get the half they deserved.

So through the list of teachers, 'till, as is generally the case, when all had been brought to the front, a rousing call was made for "Professor!"

The Professor, in response, merely remarked "this is the most grateful of all," and pronounced the Normal benediction "We are excused!"

Now, wasn't this a good way to close the term? The Scientifics' finals have been excellent. Mr. Schmitz made several improvements on former performances. First; the themes which were in U.S. History, were selected with great skill. Not one could be called common-place. They were fresh and vital topics. Besides this he arranged the speakers so that the topics were treated in chronological order. There was not a failure.

It would have done you good, friends, to have been at Gen'l Ex. some mornings ago, when Mr. Keech, in behalf of the pupils, presented to the Professor a handsome Bible for his use in the morning religious exercises. Mr. Keech, a Scientific, made a most excellent speech. He expressed with special earnestness the general appreciation which the pupils listened to and profited from the Professor's readings, comments, and prayers in the religious exercises.

Tuesday Morning. School has opened and the hall is jammed. The organization was effected in less than an hour. Everybody is happy and delighted with what they call the "after-the-election boom!" You would think all Indiana was coming to Lebanon, the Hoosiers are so numerous. We suppose there are enough left for the brethren there. Our number must be between six hundred and seven hundred. (Now, notice, we do not say six thousand and seven thousand, though if we were to say it, I doubt if you could disprove it. Numbers are so "deceiving.")

By the way, there was a mistake in our advertisement in the Oct. and Nov. *TEACHER*, to which we wish to call attention and correct. It says "Over 1500 were in attendance this morning." Just subtract a thousand and you have the right figure. The rest of the advertisement is as follows:

A much larger number this year. Twenty teachers are employed and the number will be increased if necessary. Our classes are never too large.

Decided improvements are still being made in every direction, distancing all competition.

This Institution is not an imitation; it is the originator and leader of the Grand Revolution already accomplished in Normal and College instruction, saving half the time, and three-quarters of the expense of a thorough and complete collegiate course.

Over fifty of its graduates are employed in leading Colleges and Normals, and thousands more of its graduates and students are engaged in public schools in every capacity, from superintendents to primary teachers.

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—Read carefully all of the advertisements in this issue.
It will pay.

—We wish all our readers a Merry Christmas and a Happy New Year.

—We do not hold ourself responsible for the opinions of our contributors.

—A large number of subscriptions expire with this issue. We hope all will renew promptly. We send no papers after subscriptions have expired.

—Our books have had a good sale this fall. There is no better time of the year than now for agents to reap a rich harvest with them. Our terms are exceptional. Send for agent's circular.

—We have just issued from the press two new works: *Outlines of United States History*, by Prof. R. Heber Holbrook, one of the editors of this paper and Associate Principal of the National Normal School, Lebanon, O.; and *Easy Experiments in Chemistry and Philosophy* by G. Dallas Lind, author of *Methods of Teaching in Country Schools*, *Normal Outlines of the Common School Branches*, &c. These works are both eminently practical and should be in the hands of every teacher.

—A great many copies of the November number were lost in the mails, owing to insufficient paper used as wrappers. Many packages burst open and were returned to us, others were destroyed. Luckily we have a large number of extra copies on hand and shall be glad to send a second time to any and all who did not receive the November number. We regret very much that any such thing should have happened and shall take extra precautions to see that it does not occur again.

—The *Normal Speaker* which we advertised to be out by Dec. 1st, has been delayed two weeks or more. We are sorry of this but it is one of the *inevitables*. We shall do our best to have it ready to mail Dec. 20th. This we hope will be sufficient explanation to those who have

subscribed for the work, and that we shall not be favored with any postal cards inquiring why the book does not come until after Dec. 20th, at least. Our offer to furnish the book for 25 cts. is extended to Christmas, and as many hundreds of our readers have already subscribed we hope many hundreds more will do so by Christmas. All books after this date will positively be sold at 40 cts.

—Prof. G. Walter Dale, author of *Outline of Elocution* and *Comprehensive Manual of Principles*, "Talks on Elocution," &c., is now teaching a class and delivering his course of seven popular lectures in the Central Normal College, Danville, Indiana. Prof. Dale is one of the very few practical Elocutionists of the country. He has the happy faculty of bringing the subject within the comprehension of all. Besides being an Elocutionist in every sense of the term he is a *natural teacher*—every Normalite knows the importance of the latter qualification. His book now in press will be found far superior to any work extant on the subject of Elocution. Special attention is called to Prof. Dale's advertisement in this number, and we take the liberty to say here that every School and College in the land should have his course of lectures this winter. Of Prof. Dale as an Elocutionist and of his work in the Central Normal we shall have more to say in our next number.

—We give place to the following items in reference to the schools of Westmoreland Co., Pa., as showing what a high standard has been reached in that County, and what is possible for other Counties to accomplish when the officers and people are awake to the highest interests of the Schools:

The educational affairs of Westmoreland Co. are progressive, therefore encouraging. The schools receive much attention from the Directors and patrons. There are now 380 schools in this county. Supt. Spiegel visits all these himself, and has been very successful in bringing about a closer system of classification—and this he has brought about by having a *course of study* introduced into the ungraded schools. Last year there was not a failure or a dismissal; everything passed off pleasantly and profitably. The teachers deserve much praise for the earnestness and promptness manifested by them in their duties. What has placed Westmoreland Co. among the foremost in the State is the united *interest* the teachers, directors, and patrons show in local educational meetings. We find local teachers' Institutes in very many of the townships. At these gatherings not only the teachers take a large share in the execution of the programme, but we find the directors and patrons taking an active part in the discussions on live educational questions. One other thing we must mention. Supt. Spiegel has determined from the first that none but competent professionally inclined and heart-in-the-work teachers should be licensed to teach.

The surplus of teachers this year is *less* than at any previous year. For the 380 schools there were granted 441 provisional certificates. In some of the former years the surplus reached as many as 200 and fewer schools than now. Westmoreland Co. is wide awake toward having professionally trained teachers—350 of the 500 applicants attended school. The teachers of the County have been greatly encouraged by the progressive spirit of the directors. Many townships increased the teacher's wages as well as lengthened the school term. Nearly every township is giving its teachers the week to attend the County Institute; many other liberalities are being given to our teachers at the hands of the directors,

and we are very sure no class appreciates a progressive spirit and a generous feeling more than do the Public School teachers.

The County Institute last year was the largest ever held in the County—350 teachers were in attendance. Many of the Directors were also in attendance the whole week. We had first-class instructors and lecturers, among them were Hon. E. A. Appgar, State Supt. of New Jersey; Dr. Milligan, of Allegheny City, and Rev. Henry Ward Beecher. This year we expect the whole body (380) of teachers present and a large portion of the directors. We have a programme we feel confident is not excelled by any other County in the State. The following are among the instructors and lecturers engaged: Prof. E. V. DeGraff, Patterson, New Jersey; Mr. Wallace Bruce, Poughkeepsie, N. Y.; Dr. Talmage, Brooklyn, N. Y., and Mr. R. J. Burdette, *Burlington Hawkeys*. Hon. Henry Houck and Dr. Brooks are expected to be present and give instruction on topics appertaining to the school-room. Such talent as the above will beyond question arouse the enthusiasm of the County beyond description. We predict one of the most profitable, most enthusiastic, we can safely say the *largest* County Educational Meeting during the week commencing December 27th, ever held in western Pennsylvania. Should the Educational interests of Westmoreland Co. continue to grow as they have within the past two years, we can safely predict that she will stand second to none in Educational advancements in the State. Active County Superintendents, wide-awake teachers, progressive School Boards, make *good schools, good society, and good citizens.*

—Send in your name and One Dollar and secure a copy of Prof. G. Walter Dale's *Outline of Elocution*. Reasons why you should do so:

1. Because it is the best book on the subject in the English language.
2. Because it is the finest self instructor ever prepared upon the subject.
3. Because the selections are the choicest in the whole realm of Elocutionary Literature.
4. Because it is the most philosophical analysis and concise and explicit exposition of Elocution to be found in print.
5. Because it is written in a style that will interest you while you read it.
6. Because it contains twelve appended essays that are not to be found even in substance in any one nor in all the books on Elocution now extant.
7. Because it will save you fifty cents to order in advance of issue if you accompany the order with the cash (\$1.00).
8. Because the subject of Elocution is becoming more popular and you want standard works.
9. Because this is a standard work.
10. Because after the date of issue you can not obtain a single copy for less than \$1.50.

If you ever sold a book you can sell this. As a book for agents to handle there is nothing equal to it in Educational Literature.

The letter press and binding are superb. No pains has been spared to make it first class in mechanical execution. Its matter coming from the pen of the first Elocutionist of the west is sufficient guarantee of its value.

The scope of the work is wonderful when its conciseness is considered. The whole book shows to a marvellous degree the power of condensation, as compatible with clear diction, displayed by the author.

As a book of general and polite culture no other work in its line compares with it.

It displays all the mechanism of expression and makes the student familiar with the tools necessary in human expression. It teaches how to study; how to enter into the sentiment; how to feel; how to express. Its classifications and outlines are unexcelled in any class text-book on any subject for exhaustiveness and logical arrangement. It contains essays on

1. *Emphasis.* 2—*Projection of Sound.* 3—*Timbre.* 4—*Care of the Voice.* 5—*A Course of Reading.* 6—*Dramatic Reading and Recitation.* 7 *Impersonation of Old Age.* 8—*Primary Teaching.* 9—*Hints and Suggestions, &c., &c.*

Professor Dale is a gentleman of great capability as an author and of faultless address as a gentleman. The same principles that give him these graces he has infused into his work. His readings are the most real and natural of any reader without exception before the public to-day, and his style of expression as an elocutionist marks the dawn of a new and advanced era in Elocution. He has given the whole secret of his success in his book. He has given much study to the minutiae of detail and presents in his work the most discriminating classification of elements. His Outline surpasses the best on the subject and he has amplified it through the work by placing a Sectional Outline at the head of each chapter.

A student of good common sense can take this book and study Elocution alone which he cannot do by the aid of any other book.

This is because the subject is placed before the student with such clearness in such minuteness of detail that there is no room left for misconstruction or misunderstanding. *The Attention of School Boards* is called to this work as the best reading book for advanced classes that can be procured.

The matter is new, the Selections abundant and fresh, and the tone of the book immeasurably above that of the ordinary reading book. It is the work of one of the most successful teachers of reading who is himself a living example of the high class of instruction he gives in his book. Liberal terms for introduction. Send for our circular to School boards. Agents wanted all over the world. The most favorable inducements offered. Write for terms and send \$1.00 at once for Sample Copy, to J. E. Sherrill, Danville, Ind.

AMONG OUR EXCHANGES.

The Public School Journal, Mt. Washington, O. J. E. Wilson, Editor, is a beautiful and practical monthly. It is worthy of a wide circulation.

Wisconsin Journal of Education, Madison, Wis. This is a solid, sensible paper. The opening article in the October number on Kindergartens, by J. B. Pradt, is sound.

The Practical Teacher. Semi-monthly. Chicago. \$1.25 a year. W. L. Kline, Editor. An excellent paper. The articles contributed by Prof. J. W. Cook, of the Illinois Normal are good.

Educational Weekly. Chicago, Ill. To our mind this is one of the ablest educationals published in this country. Its editorials are the best specimens of professional writing that we see in print. There is, of course, some rivalry between this and the *New England Educational Journal*. But it is wholesome. There is, or should be, plenty of room for educational weeklies in this large country. The *New England Educational Journal* has the great prestige of coming from Boston with the support of a splendid array of ability and good business management. None the less is the advantage sustained by the *Educational Weekly* of issuing from the great Western center, with the sympathies and vital ring of Western ability. It is to the credit of the West that so good a weekly is maintained. We bespeak for it the patriotic support of every teacher in the great Northwest, of which it is a worthy and able exponent.

New England Journal of Education, which is the same as the *National Journal of Education*. Boston and Chicago. \$2.50 a year.

We read this paper with as much interest as we do our Semi-weekly *New York Tribune*. It is just as essential to our existence as the daily paper. We shall be pardoned if we say that in our opinion Rev. A. D. Mayo is the genius of its columns. His iconoclastic conservatism, his upbuilding radicalism, his hatred of formalism and love of order, his impatience with professional bunkum and relish of school enthusiasm are as refreshing as they are healthy. He is doing an infinitely needed good. We believe that teachers generally appreciate it, and know that he will receive his great reward. The number 16, Oct. 21, contains a beautiful poem, "The School Girl," from W. H. Venable. It is worth the yearly subscription of the paper.

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THE
NORMAL TEACHER.
An Educational Monthly.

VOL. III. DANVILLE, IND., JANUARY, 1881. No. 11.

J. E. SHERRILL AND R. HEBER HOLBROOK, EDITORS.

BUSINESS NOTICES.

Persons ordering a change in the direction of THE NORMAL TEACHER should always give both the *old* and the *new* address IN FULL. No change can be made after the 12th of any month in the address of THE TEACHER for the following month.

New subscriptions will always begin with the first issue of THE TEACHER after they are received unless otherwise directed.

In sending stamps to this office send only of 1-cent denomination.

OUR PLATFORM.

DEFINITIONS.

Teaching is a *process*, controlled by *principles* aiming at *products*.

The Process of teaching is the training of the growing mind.

The Product aimed at by this process is the power of self-improvement.

The Principles controlling this process make it systematic.

TEACHING, then, is the systematic (principles) *art* (process) of training the growing mind toward the power of self-improvement (product).

DIDACTICS is the *science* which treats of the *principles* of teaching.

AXIOMS.

AXIOM OF ACTIVITY. The mind is *inherently* active.

AXIOM OF IMPROVEMENT. The mind is *inherently* improving.

POSTULATES.

Postulate of Influence. The mind can be directed.

Postulate of Increase. The mind can be stimulated.

EDITORIAL.

OUR NEW YEAR'S GREETING.

Happy New Year, Friends! And why should it not be? You have the best of schools and your schools have the best of teachers. You subscribe for the best of educational journals, and *THE NORMAL TEACHER* has the best of subscribers.

Blessed is he who thinks he and his are the best, for he shall be happy;—not with a lazy happiness, but with a happiness thoroughly vitalized with a “noble discontent” that will urge to more happiness. Happiness is happy, but more happiness is happier.

“What has the New Year especially in store for us as teachers” do you ask? “Educational watchman! tell us of the night, what its signs of promise are,” do you bid.

Following the thought of the old hymn, looking from our watch-tower, we see “o’er yon mountain’s height” a “glory beaming star” that tells of “joy and hope” in the teacher’s work, that portends “peace and truth” in the school-room, that declares the withdrawal of “doubt and terror” from study, that announces “blessedness and light” for our profession.

We are in the dawn of a new educational day. The sunlight of a pure and cheering educational philosophy is seeking the dark school-room and benighted teacher, not to expose and scorch but to enlighten and warm.

The reign of brutal Authority, supported by police surveillance, is being pushed back to barbarian frontiers by a new and sweet school-room civilization.

That leper, Cram, is now mostly found only in scholastic pest houses. The chains of artificial thoroughness are being broken.

That demon, Dogmatism, is slinking back into the darkest college cells, mumbling his rules and counting his beads.

The teaching aristocrat is surrendering to democratic liberty and equality in the class-room.

That tyrant, Text, is overthrown by the emancipated teacher who now holds his former despot as a helpful vassal.

College landlords are seeing their vast, entailed estates cut up into educational farms, cultivated by a happy, because a free teaching peasantry.

The gospel of a free growth in body and mind is having free course and being glorified.

But the brightest sign of promise is in the conviction growing throughout our profession that, if there is not, there must be a science of teaching—a body of fixed systematized truth controlled by the usual principles of an orderly science.

Those familiar with the thinking stratum of teachers know that there is a general yearning after law and order, an earnest groping about in the gloom of pedagogical discussion for foundations, a thoughtful desire to penetrate the haze of bewildering twilight and discover that which is shadow and that which is substance.

The accumulative stage of growth is coming to an end. The mass of facts is being subjected to a keen analysis which will ere long reveal the fundamental unities that lie hidden within them. These will soon be declared and they will be accepted because self-evident. Out of them shall flow distinct outlines of a beautiful science of teaching. The endless institute dispute of everything shall give way to the study of the established and to the further building up of a definite structure upon commonly accepted, because commonly understood, foundations.

Philosophy is driving empiricism before it. The youngest teacher will soon be enabled to feel that he can, by suitable preparation, so fill his soul with *settled* truth and guiding principles as to make his first school the happy realization of practical methods, instead of the blind struggle with a blinder fate.

The immense wastage by reason of universal experimenting will be saved. The plowing season is almost over, seed time is upon us, the harvest will come.

SOME POINTS FOR YOUNG TEACHERS.

1. Not how much your pupils learn, but the spirit in which they learn.
2. An ignoramus imbued with love for his teacher and for his books will accomplish infinitely more good for himself and others than a high standing scholar steeped in compulsion and hate.
3. Not knowledge, but a thirst for knowledge. Not to be stuffed with food, but to always have an appetite for food, is the mark of a healthy man.
4. Not that your pupils have a relish for easy study, but for hard study. Meat, not milk, pleases a strong man.
5. Not that your pupils have good lessons by reason of *you*, but by reason of *themselves*. No man gets strength by having some one else eat his dinner.
6. Not that you push or pull your pupils, but that you guide them. A well trained horse never needs the whip.
7. Not that your pupils but that you are at fault when they dislike study. A farmer never thrashes a stalk of corn for not producing a good ear. He says I did not cultivate it, weed it or drain it carefully enough.
8. Not that you can claim all the credit only when your school goes well, but that you must assume the responsibility when it goes ill.
9. Not that you are to be "goody" but good. The first means sham which your pupils will instantly penetrate; the second means grit, which, your pupils will quickly appreciate in spite of your many faults.
10. Not that you are to be good, but that you must sincerely and pluckily *try* to be good. People always judge us from what we *sincerely* try to be, not from what we are.

IS THERE A SCIENCE OF EDUCATION?

(1). What is meant by the term, Science? It has different significations, apparently. Geometry and Physiology, for instance, are called Sciences. Yet they are very unlike, so far as their scientific characteristics are concerned.

(2). Geometry presents a systematic evolution of principles from principles with a rigor of logic as beautiful as it is exacting.

(3). In Physiology, on the other hand, there is, apparently, no such orderly procedure, and no pretense is made, seemingly, of establishing a multitude of propositions by authority of a few higher ones.

(4). Is Physiology, then, strictly speaking, not a Science? Is no body of knowledge to be ranked as a Science until it attains the formal exactness of the Mathematics? Is it to be expected that every so called Science is approximating to, and will finally reach, this Mathematical perfection?

(5). By answering these questions, we shall be enabled to determine the true status, present and prospective, of the Science of Education.

(6). A Science is a body of systematized knowledge with regard to a given subject-matter.

(7). The subject-matter of any given science is a defined phenomenon.

(8). A phenomenon is an assemblage of properties, expressed by a fixed name.

(9). Knowledge is the determined relation of equality between the properties of a given phenomenon under their various possibilities.

(10). Systematized knowledge is a collection of the determined equations between the properties of a given phenomenon, grouped according to some *unifying* principle.

(11). The limits of a given Science are determined by the definition of its subject-matter. The extent of a given Science depends upon the complexity of the subject-matter and the number and variety of its possibilities.

(12). The rigor of system with which the body of knowledge of any Science may be presented depends upon the number and complexity of the properties under their possibilities of the defined subject-matter, and our familiarity with them.

(13). Let us examine the subject-matter of a few familiar Sciences to determine their scientific character. This will furnish us the requisites of Science.

(14). Then by examining the body of knowledge known as the Science of Education we may decide whether it possesses the requisites of a true Science. When, if any of these are lacking, we may decide what they are and determine how they shall be provided. Preliminary to this are a few considerations which will aid us.

(15). We have said that the subject-matter of a given Science was a phenomenon (7) and that a phenomenon is an assemblage of properties expressed by a name (8). The more common word for a phenomenon is a Thing. Any Thing is a phenomenon. That every object of the mind which can be designated by the word, Thing, is a mere group of properties, a moment's thought will show.

(16). Take *snow* for instance. What is it? It is a group of certain properties such as whiteness, crystalline structure, falling from the clouds, melting into water, &c., which when recognized by different minds as forming a group, their common expression will be Snow. What it is that possesses these properties we do not and cannot *know*, except by faith. It is the *substantia*, "the thing itself," the consideration of which, in this connection, is unnecessary, fruitless and misleading. We learn what snow is by determining its properties. So with every other object of the human understanding.

(17). Let us go farther. We *determine* the properties of any given phenomenon by simply deciding that they are like or unlike the observed properties of other phenomena. When we say snow is white, we mean that in that regard it is like some other phenomenon which makes a similar im-

pression on the retina. When we say snow will melt, we mean that it undergoes a change from solid to liquid form, which is familiar to us in other phenomena, and so on.

(18). In other words, whiteness expresses a recognized likeness, or an *equation* between the manifestations of certain phenomena. *Every word that expresses a property is an equation, or an expression for a relation of equality or likeness recognized by two or more minds as existing in certain phenomena.*

(19). The relativity of all human knowledge is thus sufficiently indicated.

(20). We now come to the consideration of the different so called Sciences.

(21). *Arithmetic.* What is the property which the mind first abstracts from things presented to its consciousness? Observe the infant when it first opens its eyes to its surrounding environment. It sees nothing because it does not see something. Its first indication of consciousness, so far as this sense is concerned, appears after a few weeks, when it begins to fix its eyes on *one* object. It sees *some* thing when it notices *one* thing. The world at first, to its infantile gaze, is a great single whole, the first knowledge of which comes from discovering some of its *many* parts, or from discovering that it is composed of parts. The properties of these parts are not recognized at all. It will follow a light part as separate from the surrounding dark part. It will follow the face of its mother as a part separate from the continuous whole which first impressed its retina. While the face of its mother is recognized simply as a part of a continuous whole, it is not *distinguished* until as a *single* whole its many parts are again separated. So that the first process of learning is the separation of the single whole into its many parts and, at the same instant, the grouping of the many parts into a single whole.

(22). Now the property abstracted first in all these phenomena is not light, nor color, nor form, nor size, but simply *unity* and *plurality*—the one, the many.

(23). We see, then, that in these, the earliest of the intuitions of the human mind, we have the properties that constitute the phenomenon *Number*, which is the subject-matter of Arithmetic.

(24). Arithmetic, then, is the Science which treats of the phenomenon *Number*, which phenomenon has only the two properties *unity* and *plurality* and the two possibilities of *increase* and *decrease*.

(25). We have said (12) that the rigor of system with which any body of knowledge may be presented depends upon the number and complexity of the properties under their possibilities of its given subject-matter and our familiarity with them. See how this is illustrated in the Science of Arithmetic. Its subject-matter is the simplest of all phenomena, because it has the fewest properties subject to the fewest possibilities. These properties being the earliest intuitions of the mind and their possibilities being those which, from the necessities of human experience, are most frequently considered, they are the most thoroughly understood and the number and order of the relations of equality existing between them have become better established than those of any other science. Arithmetic is therefore the most systematic, that is, the most logical and therefore the most scientific of all the Sciences.

(26). *Geometry*. After *Number*, what abstraction is next accomplished by the mind? Immediately succeeding, or perhaps at the same time of, the recognition of parts as constituting a whole, is the recognition of the contour of those parts and of the wholes as limiting portions of space and presenting the idea of space and portion in space. In other words, the property of magnitude is abstracted, which is soon discovered to be a phenomenon of two properties, *extent* and *position* with the possibilities of change of position and increase and decrease of extent, forming a new subject-matter for a Science.

(27). Geometry is, therefore, the science which treats of the phenomenon, *Magnitude*, whose properties are extent

and position with the possibilities of change (of position) and increase and decrease of extent.

(28). From the property, position, springs the idea of motion and direction. The property of extent involves linear, superficial and volumetric extension. The relations of equality found to exist in these properties under their different possibilities form the body of knowledge which constitutes the Science of Geometry. Since these abstractions are among the earliest intuitions of the mind and their possibilities of change, increase and decrease, from the necessities of experience, are constantly in the observation of man, they are well understood. Their relations of equality have been carefully distinguished and the order of these equations thoroughly unified. In other words, the knowledge of Geometry has become quite clearly defined and thoroughly established, that is, it has attained a rigor of logical procedure which makes it a truly scientific Science.

(29). The very limited extent of this Science should not pass unnoticed. It must be remembered that out of the infinite number of magnitudes only the few regular ones have been made the subject of equations.

(30). Neither should it be supposed that the system of Geometry is fixed beyond question. Euclid has done most to give it logical form, but many improvements have been made upon his system, and every new Geometry has for its mission the founding of a new set of definitions, axioms and postulates and a better order of procedure. Attention is here called to this, for the reason that the claim is often made that the foundations of Mathematics and their order of procedure is fixed and exact. They are fixed, but not beyond question. They are exact but only approximately. The advantage, therefore, which they have over other sciences in this regard is due to the simplicity of their subject-matters and their more frequent occurrence in human experience.

(31). *Qualitative and Quantitative Geometry.* Another

distinction arises in Geometry which could not have arisen in Arithmetic, because it is dependent upon it.

(32). So long as the equations of Geometry are between properties only without relation to *units*, the discussion is purely qualitative, that is, it is a discussion of qualities, but the moment a *quantity* of linear, superficial or volumetric extension, or of angular divergence is introduced, it becomes *quantitative*, that is, the discussion is of *amounts* and *quantities* of properties involved, which quantities must be expressed in terms of an assumed *unit* of the property under discussion. The introduction of units is the introduction of Arithmetic, the Science of units.

(33). The dividing line between qualitative and quantitative Geometry, is the proportion. At this point, the Science of Geometry becomes Mensuration and Trigonometry, the latter science being merely an extension of Mensuration by an ingenious invention whereby the measurements of angles is made homogeneous with the measurement of rectilinear magnitude.

(34). It will be best at this point to draw the important conclusion, that what has been pointed out concerning Geometry is true of all the Sciences. *They are qualitative until they involve units, (and so the Science of units, Arithmetic), when they become quantitative.*

(TO BE CONTINUED).

VIRTUE may be misrepresented, persecuted, consigned to the grave, but the righteous wake not more assuredly to the reality of their hopes, than does virtue to an immortal remembrance.

BE a bold, brave, true, honest man. If you know a thing is right, do it. If you have a solemn conviction, dare to utter it in the fear of God, regardless of the wrath of man.—*Gough.*

THE FORMATION OF LAWS.

BESSIE M. FOSTER.

"Order is Heaven's first law," is the poet's dictum; and no society or school can be successfully managed without having this aphorism ever before it. How is it to be accomplished? is the question that naturally arises in the minds of all interested.

The majority of educators labor under the fallacy that nothing can be done without the adoption of compulsory measures; consequently they establish, and attempt to enforce laws that are odious to those for whom they are designed, and to which they themselves would not passively submit. There is no profession that requires so much tact and common sense, combined with a thorough knowledge of human nature as is required in teaching. With these requisites, any person of ordinary ability may succeed; without them, failure must necessarily ensue.

Too often the teacher enters the school-room impressed with the belief that he is empowered with all the authority of a dictator; Alexander, Czar of all the Russias, is second only to himself in power. He prepares and reads a long code of rules exacting obedience under severe penalties from all who are so unfortunate as to come under his jurisdiction. As a natural consequence his pupils all detest him, and are actuated by no higher motive than fear in all their intercourse with him whose assumption of authority is so galling to the independent spirit of childhood. Failing to gain the love and confidence of those with whom he is daily associated, he finds that he has mistaken his calling, and, to the great delight of both pupils and patrons, he abandons a profession which has made him more enemies than friends, and which has been a prolific source of vexation from beginning to end.

Can we wonder at the failure of these law-givers when

such a mode of discipline renders the school-room little better than a prison to spirits whose very life is the sunshine of love and kindness? The teacher should exercise dominion over his pupils; but this great desideratum must be effected by personal influence—by a magnetism that must draw every heart toward himself with an irresistible power. He must first inspire the child with the assurance that he is his friend; must immolate all selfish motives, and strive to develop power in himself and pupils. He forms the high resolve to be a successful teacher—to surmount all obstacles in the attainment of such an end, ever looking beyond the Now at the results of the To Come. It is a great responsibility, albeit a great privilege to be thus entrusted with the training of immortal spirits upon which we are daily, hourly, making deathless impressions.

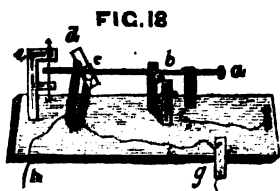
With these solemn reflections ever before him, I ask, can the teacher think of no higher mode of government than that of coercion? By appealing to that high sense of honor that exists in every soul God has created I claim that the teacher can attain the greatest power. He may occasionally have a refractory spirit to encounter, but gentle measures will usually accomplish far more satisfactory results than the enforcement of all the laws his ingenuity can devise. With Leigh Hunt, let us remember that "Power itself hath not half the might of gentleness."

The teacher should adopt no rules that he does not intend to carry into effect, as this will cause the pupils to question his veracity, and will have a tendency to detract from his own self-esteem.

Do not infer that I would not adopt regulations of some kind in my administrations in the school-room, for such a course, I claim, would be exceedingly deleterious. While I oppose the enforcement of the innumerable and rigorous laws adopted by many of the profession, some rules are indispensable to the good disciplinarian, first of which should be the adoption of the Golden Rule, under which the judicious teacher may form others, all of which must meet with the heart-felt approval of every pupil.

ELECTRIC EXPERIMENTS.

J. E. BAKER.



TELEGRAPH SOUNDER.

Principles of the Telegraph.—The wonder of the age and the crowning result of the labors of electricians is the present perfection of the electro-magnetic telegraph. Its eminent usefulness

is only equaled by that of the steam engine. The incredible rapidity with which messages are transmitted excites the intensest curiosity and admiration in both the learned and unlearned. It will only be outrivalled in strangeness, and surpassed in usefulness when the Telephone and Electric light become household instruments of comfort and human happiness.

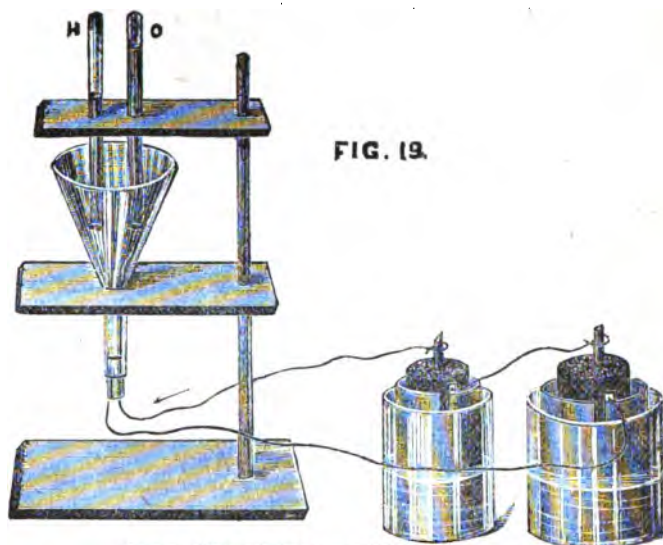
The action of the Telegraph depends upon the following principles:

1. Magnets have the property of attracting iron.
2. Electro-magnets, by means of alternately closing and breaking the circuit, become alternately magnetized and demagnetized.
3. The electric current continues in action as long as the circuit is closed.
4. The circuit may be broken and closed at will by disconnecting and connecting the wires.
5. The length of the wire through which the current passes is immaterial.

The Telegraph consists essentially of a battery, electro-magnet, and a key for conveniently breaking the circuit. The principles may be easily and impressively demonstrated with the simple contrivance represented in figure 18. To construct this piece of apparatus take an inch board about

four inches by six and fasten within an inch and a half of one end an electro-magnet with a screw put through a hole in the bend made when the electro-magnet is formed. Push the spike nail *a* through a cork *b* and pass through the cork a darning needle at right angles with the nail. This needle acts as an axis resting in uprights made of tin or zinc fastened to the board. Pass the nail through another cork *c* through which is passed, at right angles with the nail, a piece of soft iron *d* acting as the keeper which may be simply a piece of spike nail of such a length so as to reach across the ends of the electro-magnet. The parts resting on these ends should be filed smooth in order that they may fit evenly. Put in the post *e* containing two screws to regulate the end of the nail so that the keeper *d* may have about one tenth of an inch play near the ends of the electro-magnet. Loop a rubber on the end of the nail near *a* to which is attached a string passing under a wire to a screw *f*. Fasten to the board a clean piece of copper or zinc at *g*. Connect the wires of the battery to *h* and *g*. Tighten the rubber by turning the screw at *f*. Close and break the circuit by pressing and raising the wire *i* at the copper plate *g* which constitutes the key or break piece, and the regular telegraphic click is heard at the poles of the electro-magnet. As the circuit is closed and broken the soft iron of the electro-magnet becomes alternately magnetized and demagnetized causing the keeper to play back and forth.

A pupil who manufactures this piece of apparatus and explains it before his class mates will be infinitely more delighted and repaid for his efforts than in memorizing and reciting the definitions of magnet, electro-magnet, key, battery, etc. He will by thus constructing his own instruments be able to give definitions in his own words, and more he will have a clear conception of what he is talking about.



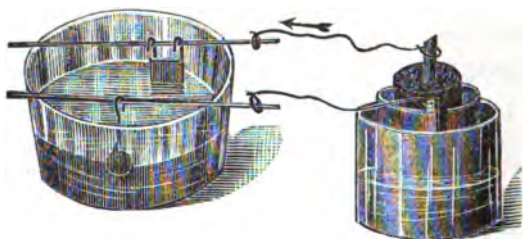
DECOMPOSITION OF WATER.

Decomposition of Water.—Water will extinguish fire, but with an electric current it can be separated into two invisible gases—oxygen and hydrogen—bearing entirely different relations to combustion. Oxygen will support combustion only and causing a flame to grow brighter; hydrogen will itself burn producing a bluish flame.

Figure 19 represents the apparatus to separate water into its constituent parts. It consists simply of a glass or tin funnel supported upon a wooden frame. In the small end of the funnel is fitted a cork through which are passed two copper wires from a battery of two or three cups, however five or six will decompose the water more rapidly. Take two glass tubes six or eight inches long one end of each being closed. They can be closed by holding over an alcohol lamp; or, by putting in corks and running sealing wax over them. Fill the funnel with water; also, fill the tubes with water and invert them over the two wires as shown in the figure. The tubes may be held in this position with a piece

of lath having two holes in it. Now put into the funnel a little sulphuric acid to make the water a better conductor, and if the wires of the battery are connected as shown in the figure, the decomposition will at once begin as shown by bubbles rising to the top of the tubes. But *very* little of the oxygen gas will collect in the tube unless there be gold or platinum put on the ends of the copper wires. If they are thus pointed and the tubes are the same size there will be just twice the volume of hydrogen as oxygen. Remove the tube which is half full by placing the thumb over the mouth then turning it up bring into the gas the end of a splinter having a recently burnt coal at the end. It at once bursts into a flame. Remove the other tube keeping the mouth *downward* bring a flame to the mouth, the gas itself will be lighted and burn with a pale-blue flame.

FIG. 20



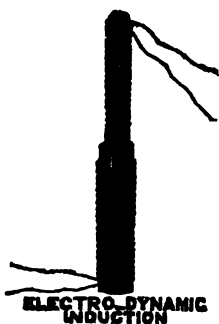
ELECTRO-PLATING

- Electro-Plating.*—Articles can be evenly coated with any thickness of gold, silver, copper, etc., by the action of a current of electricity. To illustrate the method place two wires on a glass or earthen vessel containing a strong solution of sulphate of copper. Suspend from one wire a piece of copper and from the other a silver coin. Connect with a battery as shown in figure 20, and the copper held in solution will at once deposit itself on the coin. If a solution of some silver salt be used and the attachments of the wires be reversed silver will be deposited on the copper plate. The article to

be plated should hang from the negative pole of the battery, and the metal hanging from the positive pole should be the same as that in solution.

CURRENTS PRODUCED BY OTHER CURRENTS.

FIG. 21.

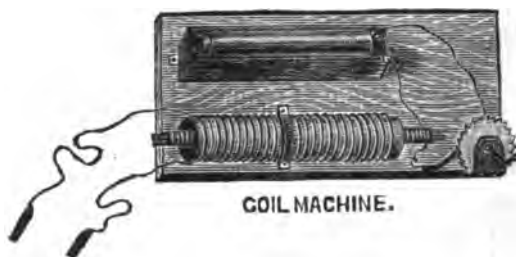


Electro-Dynamic Induction. — One of the most peculiar effects of an electric current is that of producing (by induction) another current in an adjacent wire. Take a glass, pasteboard, or wooden tube about half an inch in diameter and five or six inches long; wrap it with one or two layers of covered copper wire. (About a quarter of a pound of No. 30—fifty cents worth—will be sufficient for this experiment.) Call this the primary coil. Prepare another tube, with five or six

layers, large enough to contain the primary coil and term it the secondary coil. Connect the wires *a b*, figure 21, of the primary coil with a battery, and those of the secondary *c d* with a galvanometer. Now at the instant the primary coil is thrust into the secondary an *inverse* momentary current will be indicated by the deflection of the needle of the galvanometer. In a moment the needle will come to rest showing that the current is only momentary. Now remove the primary coil and again the needle will be deflected but in an opposite direction being a *direct* current; that is, in the same direction as that of the primary coil. The direction of the currents can be determined by Ampere's law. If the primary coil be allowed to remain in the secondary and the connection with the battery be broken and closed at 6 the same phenomena will appear as before. Place the ends of the wires *c d* in the mouth, the effects of the current will be increased owing to their inductive action.

The Induction Coil is made upon this principle; and its effects are incomparably greater than any electric machine, producing sparks over 30 inches in length.

FIG. 22.



Induction Coil or Coil Machine.—Prepare two coils the same as in the preceding experiment except in the primary coil use No. 12 covered copper wire two or three layers, and in the secondary use No. 36 about fifteen layers, placing a piece of writing paper between each layer. Place in the primary coil a bundle of soft iron wires which are to be preferred to an iron rod because they become demagnetized more suddenly when the current is broken. The iron wires should be allowed to become rusty so that they will be sufficiently insulated from one another. Figure 22 represents the general requirements in the construction of the Coil Machine. The coils, the primary within the secondary, are fastened to board, to which also is made fast a battery consisting simply of a copper trough, made with sheet copper by a tinner, in which is placed a scroll of sheet zinc, the metal contact being prevented by placing two strips of blotting paper in the bottom of the trough. Either a solution of sulphate of copper is used or water with a little sulphuric acid is added. Now to get the greatest effects there must be some contrivance of continuously completing and breaking the primary circuit. The most convenient plan perhaps is to fasten one of the wires of the primary coil to a file and the other to one of the battery wires, then rub the end of the other wire of the battery over the teeth of the file. A more substantial way is that shown in the figure, consisting of a metal spring pressing against the teeth of a metal

wheel. Both may be made of sheet copper, the wheel being notched with scissors. One end of the wire of the primary coil is attached to the spring, the other to one of the battery wires and the other battery wire is placed in metal connection with the wheel by being fastened to a piece of copper that presses against the end of the axle of the wheel. The wheel can best be fastened to the axle by forcing the wire in a small piece of wood then fastening the wheel to the wood being careful that it is in metal contact with the axle. Then the long end of the axle may be bent to form the crank. When the wheel is turned the circuit is made and broken at each time the spring passes a tooth producing a series of induced currents in the secondary coil whose effects can be observed by grasping the poles which may be made by attaching two pieces of zinc to the ends of the secondary coil. If this machine be constructed with care its effects will be much more than one person can endure. In most machines the circuit of the primary coil is broken and closed with a small electro-magnet but it is adjusted with greater difficulty.

WE heard a teacher relate it quite recently. He determined, in his school of 26 pupils, to stop whispering entirely. Having forbidden it, he made it his chief business one day to watch for violations of his rule. He observed one or two only. On the next day, there was scarcely an offence; and, on the third, he gave special attention, but perceived none at all. He determined to make thorough work; he had devoted himself three days to the accomplishment of his purpose; and he flattered himself that he had succeeded. But, determined to leave no chance for doubt, at the close of school on the third day, he passed to each pupil a slip of small paper and requested each one who had whispered that day to put a certain mark on this paper. The pupil's name was not to appear on the paper, the object being not to catch the offenders, but to furnish testimony to the success of the attempt. The teacher immediately collected the papers, but thought it prudent not to examine them until he was alone. When he reached his room and made the examination, he found that only 25 out of 26, according to their own testimony, had whispered that day! This story has a moral; in fact, it has several, but we leave our readers to make their own reflections.

—*Exchange.*

NOTES AND QUERIES.

MATHEMATICS.

1. A pole is erected in the middle of a street, and the shortest distance, from the top of the building on the one side of the street to the top of the pole, is 80 feet, and from the top of the building on the opposite side of the street to the top of the pole, is 90 feet, the height of the buildings being 50 and 30 feet respectively. Required the height of the pole.

URIAS SHAEFFER.

2. A and B start together from one point and travel toward another 132 mi. distant. A at the rate of 8 mi. and B 5 mi. per hr. In how many hr. will A be just half way between B and the point toward which they are traveling?

WM. W. SMITH.

3. If a segment 3 in. thick be cut from a sphere 8 in. in diameter, what per cent. of the sphere will remain?

J. I. STRAWN, *New Cumberland, O.*

4. Sold 20 doz. feather dusters, giving the purchaser a discount of 10, 10 and 10%: his discounts amounting to \$325.20; how much was my price per dozen?

W. D. D., *Fitchville, Ohio.*

5. A dealer in notions buys 60 gross shoe-strings at 70 cts. per gross, list for 50, 10, and 5% off; if he sell them at 20, 10, and 5% off list, what will be his profit? (Explain as you would to a class). *Id.*

GRAMMAR.

1. Diagram and parse the underscored words:

Banished from Rome! *what's banished*, but set free
From daily contact of the things I loathe?
Tried and *convicted* traitor! Who says this?
Who'll prove it, at his peril on my head?—Croly.

—*Harvey's Grammar, p. 183.*

J. McCLELLAND.

2. "There is not a string attuned to mirth
But has its chord of melancholy."—Hood.

Parse "*But*."

C. C. FOUST.

3. A cargo is worth 7 times the ship; *what part of the cargo* is $\frac{1}{8}$ of the ship and cargo?

Parse underscored words.

F. FAUL, *Winesburg, O.*

4. "These ages have no memory; but they have left a record in the desert—columns strown, &c.

Please diagram.

O. P. WILCOX.

MISCELLANEOUS.

1. Why is the climate of Michigan so much milder than that of Iowa?

AMANDA VANTRUMP, *Lawson, Mo.*

2. When and where was the first popular assembly held in the New World?

Id.

3. Over how many degrees of latitude on the Earth's surface does the sun throw vertical rays at any one time?

W. J. MILLS.

ANSWERS.

1. [Vol. III, No. 9, Q. 2, p. 336.]

Required the length of one side of the largest equilateral triangle that can be measured within a circle 100 ft. in diameter.

Ans. The radius of the circumscribed circle $\times \sqrt{3}$ = the side of the inscribed equilateral triangle. (Davie's Legendre, Book V., Prop. V., Cor. 2.): therefore, $50\sqrt{3} = 86.6025$ ft. = side of the triangle.

CORNELIUS DILLY.

2. [Vol. III, No. 9, Q. 3, p. 336.]

A two-inch plank will lose in planing $\frac{1}{2}$ inch in width and in thickness, and in solidity 918 cu. in.; but now the plank is three times as long as wide. How wide is it?

Let x = width of plank after planing.

$3x$ = length of plank.

$\frac{1}{2}(x+2)$ = cu. in. in 1 in. of the length, planed off.

$918 + \frac{1}{2}(x+2) = \frac{1836}{x+2}$ = length of plank.

$$\therefore 3x = \frac{1836}{x+2} = x^2 + 2x = 612.$$

$$x = 23.75 \text{ 88} + \text{in.}$$

Id.

3. [Vol. III, No. 9, Q. 9, p. 337.]

A and B start from the same point and travel in the same direction. A travels 18 mi. a day and travels 9 days, then turns and travels as far back as B had traveled in 9 days, turns again and overtakes B $22\frac{1}{2}$ days after starting. How far does B travel in one day?

Sol. Since A travels 18 mi. a day, in $22\frac{1}{2}$ days, he would travel $22\frac{1}{2}$ times 18, or 405 miles. A travels the distance B would travel in $22\frac{1}{2} + (9 \times 2)$ or $40\frac{1}{2}$ days. Therefore B travels as many miles a day as $40\frac{1}{2}$ are contained times in 405. $405 \div 40\frac{1}{2} = 10$ miles a day, *Ans.* H. A. WITHEE.

4. [Vol. III, No. 9, Q. 8, p. 337.]

Three men, A, B and C, residing at the several corners of a triangle, the sides of which are 65, 70 and 75 chains, agree to build a school house, the center of which shall be equally distant from the residence of each. What is that distance?

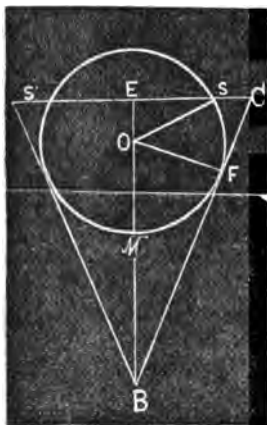
Solution. $75 : (70+65) :: (70-65) : 9;$

$(75+9) \div 2 = 42$, $\sqrt{70^2 - 42^2} = 56$ = perpendicular of triangle. $(70 \times 65) \div 56 = 81\frac{1}{4}$ = diameter of circumscribing circle; $81\frac{1}{4} \div 2 = 40.625$ chains.

J. W. JONES.

5. [Vol. III, No. 4, Q. 3, p. 149.]

If a heavy sphere, whose diameter is 4 inches, be dropped into a conical glass full of water, whose diameter is 5 inches and altitude 6 inches, how much water will run over?



Sol. Let the diagram represent the ball and glass.

Given $\begin{cases} BE = 6 \text{ inches.} \\ EC = \frac{1}{2} AC = 2.5 \text{ inches.} \\ OF = OS' = OM = 2 \text{ inches.} \\ BC = \sqrt{BE^2 + EC^2} = \sqrt{6^2 + 2.5^2} = 6.5 \text{ inches.} \end{cases}$

The triangles BEC and BFO are similar, for they are right angled at E and F and have the common angle B. Hence $EC : OF :: BC : BO$, or $2.5 : 2 :: 6.5 : 5.2$. $EO = BE - BO = 6 - 5.2 = .8$. $EM = OM + OE = 2 + .8 = 2.8$ inches = altitude of the segment MFS'. $Es' = \sqrt{Os'^2 - OE^2} = \sqrt{2^2 - .8^2} = \sqrt{3.36}$. Now the quantity of water that runs over is equal to the volume of the segment s'FM. The geometrical formula for finding the solidity of the segment s'FM may be thus expressed. *Multiply the square of the height plus three times the square of the radius of the base, by the height, and this product by .5236.* Height = 2.8 in.,—the square of which = 7.84. Radius of base = $\sqrt{3.36}$, the square of which is 3.36, and three times the square = 10.08. $\therefore (7.84 + 10.08) \times 2.8 \times .5236 = 26.271536$ cu. in. Ans.

H. A. WITHEE.

6. [Vol. III, No. 8, Q. 14, p. 299.]

I had a six per cent. bond of \$800 dated Jan. 1, 1877, and due Jan. 1, 1878. On July 1, 1877, I sold the bond to Mr. Smith in such a way as to give him 8 per cent. on his investment. If Mr. Smith borrowed the money, needed to pay the note, from bank, at 10 per cent., for 90 days, what was the face of the bank note?

106% of \$800 = \$848, amount due Jan. 1, 1878.

Amount of \$1 at 8% for 6 mo. = \$1.04.

$\$848 + \$1.04 = \$849.04$, sum paid for bond July 1, 1877.

Proceeds of \$1 for 93 days at 10% = \$.9741.

$\$849.04 \div \$.9741 = \$871.50$ = face of bank note.

CORNELIUS DILLY.

7. [Vol. III, No. 8, Q. 13, p. 299.]

A man, through his broker, invested a certain sum in U. S. 5-20's at $107\frac{1}{2}\%$, and twice as much in 10-40's at $98\frac{1}{2}\%$, brokerage in each case $\frac{1}{2}\%$. His income from both investments was \$1674. How much did he invest in each kind of stock?

Let 100% = par value of bonds.

$107\frac{1}{2}\% + \frac{1}{2}\%$ brokerage = 108% of par value = cost.

6% = income on bonds.

$1\frac{1}{8}\%$ = $5\frac{1}{8}\%$ income on investment.

$98\frac{1}{2}\% + \frac{1}{2}\%$ = 99% of par value in 2nd investment.

5% = income on bonds.

$\frac{1}{8}\%$ = $5\frac{1}{8}\%$ income on 2nd investment.

He invested twice as much in 10-40's.

$5\frac{1}{8}\% \times 2 = 10\frac{1}{4}\%$ per cent.; $5\frac{1}{8}\%$ per cent. + $10\frac{1}{4}\%$ per cent. = $15\frac{3}{8}\%$ per cent.

$\$1674 + 15\frac{3}{8}\%$ per cent. = $\$10692 = \frac{1}{4}$ of whole inv't. = sum invested in 5-20's, and $\$21384$ = sum invested in 10-40's. Id.

8. [Vol. III. No. 8, Q. 10, p. 299.]

A bank by discounting a note at 8% received for its money a discount equivalent to $8\frac{1}{2}\%$ interest. How long before due was the note discounted?

Let 100% = face of the note.

8 per cent. + $8\frac{1}{2}\%$ per cent. = $94\frac{2}{4}\%$ per cent. = proceeds of the note.

100 per cent. - $94\frac{2}{4}\%$ per cent. = $5\frac{1}{4}\%$ per cent. = discount for the "time to run."

The time is such a part of a year as this discount ($5\frac{1}{4}\%$ per cent.) is part of 8 per cent.

$\therefore 5\frac{1}{4} + 8 = \frac{33}{4}$ of a year = 8 mo. $24\frac{1}{4}$ da. before the note is legally due.

Id.

9. [Vol. III, No. 9, Q. 7, p. 337.]

What number is that which being divided into 4 or 5 equal parts, the product of all the parts in either case will be the same?

Let $x \times$ = the number.

Then, $\frac{x}{5} \times \frac{x}{5} \times \frac{x}{5} \times \frac{x}{5} \times \frac{x}{5} = \frac{x}{4} \times \frac{x}{4} \times \frac{x}{4} \times \frac{x}{4} \times \frac{x}{4}$ $\therefore \frac{x^5}{5^5} = \frac{x^4}{4^4}$ $\therefore 256x^5 = 3125x^4$ by clearing of fractions.

$256x = 3125$, by dividing both members by x^4 $\therefore x = \frac{3125}{256} = 12\frac{5}{8}$. Ans.

H. A. WITHEE.

10. [Vol. III, No. 8, Q. 5, p. 300.]

There are sixteen pupils in my school, *who* people do honor.

There are sixteen pupils in my school *whom* people do honor.

(There)

$$\left\{ \begin{array}{l} \text{PUPILS} \left\{ \begin{array}{l} \text{sixteen} \\ \text{people} \\ \text{do honor} \end{array} \right. \mid \text{whom} \\ \text{ARE in school} \mid \text{my.} \end{array} \right.$$

There, expletive used to introduce sentence.

Whom, pro. rel. ant. pupils, 3rd. plural obj, case, obj. of 'do honor'; do honor, v. reg. trans. act. ind. 3rd. plural to agree with sub. 'people.'

JOHN W. WILHOIT.

12. [Vol. III, No. 8, Q. 1, p. 800.]

What was the "Great Model" in the history of the U. S.?

Ans. The "Great Model" was a constitution for the government of the colony of North Carolina, formed in the year 1669 by John Locke, by request of Sir Ashley Cooper, to whom it had been assigned.

NOTES.

Editors Normal Teacher:

In reply to Mr. Paul Peltier, I have to say, that my discussions of the higher equations aim not so much at solutions of them as they seek to show the beautiful curves which these equations produce. Nevertheless, if he will solve the following equations, not approximately, "but by methods involving the solution of quadratic equations," I will do also in regard to the equations he named.

$$x^3 + 4x^2 + 3x = 1$$

$$x^3 + 3x^2 = 1$$

$$x^3 + 3x^2 = 3$$

The value of x , in each of these equations, if substituted in $\sqrt{1-x}$, will give respectively the length of one side of a Heptagon, of a Nonagon, and of a Polygon of 18 sides.

In conclusion I must also say, that I am very much pleased with Mr. Peltier's contributions. He understands his subjects, is a good mathematician, and can justly be called one of your ablest contributors.

ELIAS SCHNEIDER, *Milton, Pa.*

DEPARTMENT OF THEORY AND PRACTICE.

MY TRAINING CLASS.

BY F. P. ADAMS, PRINCIPAL CENTRAL NORMAL COLLEGE, DANVILLE, IND.

GRAMMAR.—I.

Teacher. Miss Alice, what directions can you give for teaching the noun to a beginning class in grammar?

Miss Alice. I would first tell my pupils what a noun is, and give them examples. I would next have them give other examples.

Teacher. Are there any criticisms on Miss Alice's answer?

Mr. Barber. I would not tell them what a noun is, but would have them give me the definition.

Miss Cora. I have an entirely different method. I first write a number of different kinds of words on the board. I then ask them to point out the name-words. I next have them write on the board or slates all the name-words they can think of. Then I have the pupils examine and criticise each others work—pointing out errors in spelling, capitals, neatness, &c.

Mrs. Cook. I like the plan proposed by Miss Cora. I have used it, I think, with good success. I however, object to one expression used by her, that is "name-word." I think our teachers make a great mistake by using such expressions as "name-word," "quality-word," "action-word," "telling

sentence," "asking sentence," &c. Why not say, point out the words that are the names of things, that denote action &c? We shall thus not only teach them grammar but also a little common sense. My criticism may seem a little harsh but I am very much opposed to this baby talk.

Miss Kate. I don't see any harm in saying "name word," "action word" &c.

Mr. Moschell. I agree with Mrs. Cook. I think it is a good deal like baby talk, besides the pupil will have to learn the proper name after a while and why not teach him the right term as soon as he has the proper idea.

Mr. McKee. I fully agree with Mrs. Cook and Mr. Moschell. You will notice one of these expressions is "telling sentence." Now what does telling sentence mean? Will not the pupils in after years have to learn a different meaning for "telling sentence," "telling speech" &c.

Teacher. We have already occupied enough time in this discussion. I am glad to see you take the stand against this nonsense. Mr. Troutman how would you teach pupils number?

Mr. Troutman. I would first teach them that number is a distinction of nouns to denote one or more than one. I would then show them what the singular number was, and then what the plural number was.

Miss Ross. I think he ought to have said *is* instead of *was*.

Mr. Troutman. I accept the criticism.

Teacher. Very well, have you any further criticisms?

Miss Hoover. I object to the order in which he gives the definition. I would first have them give a number of words that denote but one, next a number of words that denote more than one. They will then be prepared to understand the definition, that words that denote but one are singular and that those which denote more than one are plural.

Teacher. Very well said Miss Hoover. Mr. Graves how would you teach gender?

Mr. Graves. I would have them write on the board or slates the names which are applied to males, then names which are applied to females, next names which are applied to either or both males and females, lastly the names which are applied to neither sex. Having given a number of terms belonging to each class, they are ready to receive the terms masculine, feminine, common and neuter.

Teacher. Miss Carrie, do you not think it would be better to give the definitions first and then examples?

Miss Carrie. No sir, I do not. That is, however, the way I was taught, but it is not the way we learn in business or in any of the actual pursuits of life. It is not the order of Nature. I have therefore come to the conclusion that it is not the way to teach grammar.

Teacher. Ladies and gentlemen: I think you can not fail to see the superiority of the plans here proposed over those by which most of were taught and we may say over those plans practiced in the majority of our schools. Of course you will readily see that the same method can be

easily applied to person and classes. How would you teach case, Mr. Horton.

Mr. Horton. I do not think that case should be introduced at this stage of the work. They must first learn something of the verb.

Teacher. How many agree with Mr. Horton? I see nearly all the hands raised. How many differ?—only a few. The majority is right.

Have you any further suggestions to make concerning the parsing of a noun?

Miss Travers. I think they should be taught to write the parsing as far as we have gone.

Teacher. Would it not be as well to give the parsing orally?

Miss Travers. I think not. They will be more apt to get their lessons if we have them write the parsing, and will also learn penmanship.

Mr. Mitchell. I think if we have them to write their lessons, they will learn to depend on their paper, will copy their lessons from the work of other pupils and will fail to fix the points of the lessons in their mind, besides it takes a great deal of time.

Miss Kate. I differ from Mr. Mitchell. The teacher with a little tact can prevent them from copying the lessons, and we all know when we write anything down we remember it much better.

Teacher. Miss Kate, you are quite right. Are there any other points to be gained by writing the parsing except penmanship and preparation of the lesson?

Miss Josie. I think the pupils will, if the teacher is careful, learn to be neat and accurate.

Miss Mattie. I think they will learn punctuation, capitalization, spelling and a business hand.

Teacher. Mr. Rich, will you write on the black-board the advantages to be gained by written work?

Mr. Rich writes:

1. Spelling.
2. Punctuation.
3. Capitalization.
4. Penmanship.
5. Neatness.
6. Form.
7. Accuracy.
8. Complete preparation of the lesson.

Teacher. Have you anything further to suggest on this subject?

Mr. Prettyman. I wish to suggest that the teacher can not use too much care and patience in having all the work both oral and written thoroughly criticized. It is not enough to tell them to be careful in spelling, punctuation, neatness, &c. We must by daily drills *train* them to these habits.

Teacher. I shall now have to close this recitation. Whether conscious or unconscious, you have given expression to advanced views in the matter

of teaching. I commend to you the study of the order of nature and the natural development of the mind. I will at the next recitation ask you to give your methods of teaching the verb. You are excused.

OUR READING CLASS.—THE DICTIONARY.

BY R. HEBER HOLBROOK, ASSOCIATE PRINCIPAL NATIONAL NORMAL SCHOOL.

Ah, I see you have your dictionaries. Good. Let us see what is in them. Turn to the first thing of interest. It is of course the frontispiece. What is a frontispiece, do you ask? How shall we find out? Of course, use the dictionaries. Now stop a moment. I see many of you flopping great quantities of leaves back and forth. If you use your dictionary much, that will wear it out before you are half through with it. Instead of that, close the book a moment. Now open it as near to "F" as you can. How many hit it? Several, I see. Now take the upper corners of the leaves that you must turn, pull them up so that you can see the word just under them. For instance I have opened to "feat" which is in the right and upper corner. I must go forward. I pull up a quantity of leaves just enough to show me the word "izzard." I let a good many go. "Hoiden" is before me. More go. "Formal" is there. I must go forward. With my first and second finger I rapidly catch up leaves passing "fraction," "fribbler," "from," coming to "frustraneous." "Frontis-piece" is between these, I therefore open to this place. Looking down the column I see that the word "frustraneous" which was in the right hand upper corner, in large type, is the last word on the page. At the left upper corner I see "frounce," which I find is the first word on this page. My word is not between them but back of "frounce," for the first letters of it are f-r-o-u, and the first letters of mine are f-r-o-n. I look to the left page. The word in the left upper corner, at the top is "fromward." My word is ahead of this because n is after m. I look to the top of the second column and find "front," at the top of the third column and find "frost." My word must be in the second column. I run right down, watching the first letters of the words. I see "front-a," "front-e," "front-i" that comes nearer, "fronti-e," "frontig," "frontin," "frontis," which is my word, "frontispiece." Now this drill may seem quite elementary, but, frankly, how many of you did not know that these were catch-words in large type at the top corners, and that the words were arranged alphabetically, not only by the first letters, but by every letter in the word. Several. That is honest. I once saw an aged teacher hunt a long while for the word "croquet" when he should have known that when the word following "crop-sickness" is "crove," that it was not in the body of the dictionary, and that if it is anywhere in the book it is in the supplement at the back of the vocabulary.

But now let us look at this word. The first peculiarity that strikes me is

a curved mark over the o. What does it mean? The short sound of o, you say? How do you know it is? That is so. All look down to the bottom line of the two pages, where you see familiar words with all the different marks showing what each mark means. But I find no word with this mark over any of its letters. I see the vowels at the left with this mark and the word "short" following. What does that mean? But supposing I don't know what the short sound of o is? That is right. All turn to page XL as has been suggested. There you find the "Key to the Pronunciation," a tabular arrangement of all the sounds, indicated by marks in the general vocabulary, illustrated in common words. Notice the marks at the bottom. They are valuable. Let me also call your attention to the "Explanations" given in the succeeding pages. There you will find every peculiarity of pronunciation in our language most thoroughly discussed. Glance also to the "Synopsis of Words Differently Pronounced," on page LI.

Now turn back to the word "frontis-piece." The next mark I notice is after the letter t. What about it? How do you know. Right: All turn back to page XL and read the last sentence. The next peculiarity in our word is that t and i are further apart than the others. Yes, the accent type causes the space but it is also to indicate the division of the syllables, since the hyphen cannot be conveniently used at the same time. (See p. XL, paragraph headed "Accent"). The next mark is the hyphen. Does that mean that this is a compound word or that it is the division of the syllables? No, it is not a compound word. Turn to page LXXI, and you will find all the "Abbreviations Used in this Work" explained. Read the last sentence on this page. You see the heavy hyphen indicates the compound word, the light one, its syllabification.

What does the "n" following the word mean? Yes, after each word you will find an abbreviation indicating the part of speech, n. for noun, adv. for adverb, a. for adjective, v. t. for verb transitive, v. i. for verbs intransitive, and so on.

What do all the words in the brackets mean? Right: You can trace among these words the history of this word. You see it gives first the French, then the Italian, then the Spanish, then L. Lat. meaning Low Latin, or Late Latin to distinguish it from the Classical Latin. It is interesting to see that this word is really Latin, it being from *frons* meaning front and *specere* to view.

Now we are ready for the definition. First is given a general one then two technical ones marked (a) and (b) the first being used in Architecture, the second the definition we are looking for.

So, in looking out one word intelligently you have learned how to look out any other word. But let me call your attention to another peculiarity. Look to the word "front." In a parenthesis, is a word spelled "frunt." You see at once that this is the pronunciation of the word spelled. Who can refer me to the remark explaining this. No one? Then turn to the "Key,"

page XL, at the bottom, read the paragraph headed "Respelling for Pronunciation," and note particularly the second sentence.

Again, immediately following this (frunt), in another parenthesis, is, Synop., § 130. This is evidently a reference, but where? I was afraid it would not be understood. Turn to page LI, at the top you see § 130. Synopsis of words, &c. In this synopsis you look for the word "front," and you see it is pronounced in two ways.

One more point, then we are through with this part of our investigation. Turn to the word "Frost," you see in parenthesis the figures 21. Ah, I see you have remembered. Yes, turn again to page XL, at the bottom, the paragraph headed references, explains. Now notice that on the next page the long article headed "Principles of Pronunciation" is subdivided into paragraphs to which these figures always refer. Now by reading § 21, you see that when you say "frawst" you are vulgar, and when you say "frost," with o short you are affected. These references are always exceedingly interesting and our pronunciation would be much purified and unified if careful attention were always given to these references.

But this will suffice for this lesson. Our next will be upon the contents of the dictionary.

GRAMMAR DEPARTMENT.

EXERCISES IN SYNTAX.

BY A. HOLBROOK, PRINCIPAL OF NATIONAL NORMAL SCHOOL, LEBANON, O.

1. He's not (1) *what* I took (2) *him* to be.
2. We made (3) *him* our (4) *guide* and called (5) *him* (6) *captain*.
3. We never thought of (7) *him* being a (8) *general*.
4. *Washington* than (10) *whom* there never was a purer (11) *patriot* we call the (12) *father* of our country.
5. Oh (13) *Mercy*! (14) *What* can I do?
6. (15) *It* was thought a (16) *miracle* for (17) *him* to leave off drinking
7. When (18) *it* struck ten, (19) *it* just began to rain.
8. They took (20) *it* to be their (21) *cousins* that alighted from the stage.
9. The Warren Co. fair began on the same day (22) *as* the Clinton Co. fair.
10. To (23) *as* many (24) *as* received him to them gave he power to become the (25) *sons* of God.
11. (26) *It* was not from his being my (27) *guardian* that the difficulty arose.

12. considered (28) *him* just (29) *what* the investigation proved.

Articles 187—226 inclusive, Articles 276—279 inclusive and Articles 1087—1122 inclusive in Holbrook's Complete English Grammar, will explain all the constructions in the above Exercises. The Articles are too lengthy for insertion here.

INFINITIVES AND PARTICIPLES, FROM HOLBROOK'S COMPLETE ENGLISH GRAMMAR.

I. Infinitives.

Art. 888 Rule XX.—Infinitives and participles have the construction of nouns, adjectives, and adverbs; as, *to drink* is dangerous; The army had orders *to march*; He waited *to state* his case; *Lying* is sinful; The horse *running* away broke the buggy; They came *pleading* for peace.

1. Use of the Infinitive.

889. a. As a *noun, adjective, or adverb*.

890. (1.) Used in the predicate after the verb *be*, the infinitive may denote:

891. (a.) A simple equivalent; as, To die is *to sleep*.

892. (b.) Possibility or obligation; as, Lead is *to be found* in Missouri; This rule is *to be observed*. In the last two instances the infinitives have the construction of *adjectives* in the predicate.

893. (c.) Something determined or expected; as, We are *to go* next Tuesday. In this case *to go* has the construction of a noun, being the object of *expecting* or *intending*, understood.

894. (2.) The infinitive after *have* denotes necessity; as, We *have to go*; He *has to do* better. Here the infinitive has the construction of a noun, and is the object of the verb *have*.

895. (3.) The infinitive is used after most verbs to denote purpose; as, He came *to study*. *To study* is an adverbial element of purpose limiting *came*; in other words, it has the construction of an adverb.

896. (4.) The infinitive is used in comparisons after *so, as, too, and than*; as, Be so good *as to go*; He knew better *than to resist*. The first sentence expanded reads thus: Be so good *as* it is good *to go*. Here *to go* is plainly an adverb limiting *good*. In the second example *to resist* has the construction of a noun, being the subject of *is* understood. Supplying the ellipses the sentence reads thus: He knew better than [to think that] *to resist* (equivalent to, resistance) [is safe.] The elliptical infinitive *to think* has the construction of an adverb limiting *better*.

897. b. As a *verb*, the infinitive may have all the the modifications of a verb except person or number.

a Use of the Infinitive Sign.

898. a. When several infinitives come together, the sign *to* is often used with the first and omitted before the others; as, They came *to* see, hear and judge for themselves.

899. b. Nothing should come between the infinitive and its sign *to*; as John was told *not to go*; rather than, John was told *to not go*.

II PARTICIPLES.

1. Use of the Participle.

900. a. As a noun, adjective, or adverb.

901. (1.) Used in the construction of a noun in the nominative, the participle may be either the subject of a finite verb or in the predicate after it; as, *Promising* is not *performing*.

902. (2.) Used in the construction of a noun in the objective, the participle may be the object of an active transitive verb or of a preposition; as, Avoid *defaming* your neighbors; He desisted from *persecuting* his enemies.

903. (3.) When the participle is used as a noun, its subject is frequently expressed in the possessive case; as, Nothing prevented the soldier's returning home. But by enallage the objective is often used for the possessive; as, I did not think of *them* returning so soon. In this sentence, *them*, the objective subject of the participle, is used by enallage for the possessive subject *their*. But often the *possessive* construction gives a meaning *entirely different* from the *objective*. This may be readily seen by comparing the following sentences: There is no harm in *children's* playing by the roadside; There is no harm in *children* playing by the roadside. The first asserts that there is no harm in *the playing* of the children; *the second*, that there is no harm in the *children themselves*.

904. (4.) When a participle is preceded by an article or an adjective, it becomes a noun and must be followed by the preposition *of* to govern the noun which was, before, its object. Thus, Many hands are employed in *printing* dailies; or, Many hands are employed in *the printing of* dailies. In these forms of expression, *the* and *of* must be either both used or both omitted. The two constructions, however, are not always exactly equivalent. For example, the sentences, We experienced great pleasure in *hearing* John; and, We experienced great pleasure in *the hearing of* John, have very different meanings. In the use of *the* and *of* the writer must be guided solely by the sense and harmony of the passage.

905. (5.) A participle may become an attribute by the *implied affirmation* of an intransitive verb: as, The vine lies *withering* on the ground; that is, The vine is *withering* in lying on the ground.

906. (6.) The participle has all the modifications of a verb except person and number.

907. (1.) The present active participle of many verbs whose passive form does not express continued action, is used with the verb *be* in a passive sense to denote progressive action; as, The fleet *is building*; The house *is refitting*.

908. (c.) Errors in the use of the participle:

909. (1.) The use of the *past participle* for the past indicative; as, I *seen* him fall; John *done* that mischief.

910. (2.) The use of the *past indicative* instead of the past participle in forming the *past perfect* tense; as, We *have saw* much better times; Mary *had wrote* a letter; They *had just went* home.

911. (3.) The use of the past indicative active as a past passive participle; as, He sent a letter *wrote* on parchment.

912. (4.) Ambiguity in the reference of the participle should be carefully avoided; as, He guided the man *eying* him closely.

For a more comprehensive discussion of participles and infinitives, see Holbrook's Grammar, pages 69-74, inclusive.

EXAMINATION DEPARTMENT.

QUESTIONS PREPARED BY THE INDIANA STATE BOARD OF EDUCATION, FOR THE EXAMINATION OF TEACHERS IN NOVEMBER, 1880.

WRITING.

1. What is the usual proportion between the height of small and capital letters? 10.
2. Name the capital letters in the order in which you would introduce them for analysis. 10.
3. Write the ten digits as you would teach your pupils to make them. 10.
4. At what age or in what grade would you introduce the use of pen and ink? Why? 2 pts, 5 each.
5. Explain the construction of the small *b*.
Write this couplet as a specimen of your writing:—
"For of all sad words of tongue or pen,
The saddest are these: 'It might have been.'"

1 to 50.

Let the penmanship of the candidate as shown in the answers to the above questions be marked from 1 to 50 according to the judgment of the Superintendent.

SPELLING.

1. Mention six different letters and combinations of letters that may be used to represent the long sound of *e*. Write a word illustrating each. 10.
2. In the preparation of a spelling lesson and in the recitation what attention should be given to the spelling of words that are not liable to be missed by any member of the class? 10.
3. Indicate the sounds in the following words by the use of diacritical marks: *Police, sacrifice, George, extraordinary, heifer*. 10.
4. Spell 20 words pronounced by the examiner. 70.

READING.

1. Describe the phonic method of teaching reading. 10.
2. What is the purpose the teacher should have in teaching advanced reading as distinguished from his purpose in teaching primary reading? 10.

3. Write a series of questions that would aid the pupil in a mastery of the thought of the following selection:—

"The stag at eve had drunk his fill,
Where danced the moon on Monan's rill,
And deep his midnight lair had made
In lone Glenartney's hazel shade;
But when the sun his beacon red
Had kindled on Ben Voirlich's head,
The deep-mouthed bloodhound's heavy bay
Resounded up the rocky way,
And faint, from farther distance borne,
Were heard the charging hoof and horn."

4. Why is this selection called poetry? 10.
5. What kind of grammatical modifier is the second line? The fourth line? What does each modify? 10.
6. The candidate should read a selection, upon which he may be graded from 1 to 50.

ARITHMETIC.

1. If the dividend and the divisor be concrete, what will the quotient be? Why? 2 pts., 5 each.

2. When it is 5 A. M. in Paris ($2^{\circ} 20'$ E. Long.), what is the time in New York ($77^{\circ} 15'$ W. Long)?

Proc., 5; Ans., 5.

3. A grocer bought $23\frac{3}{4}$ lb. of sugar at $12\frac{1}{2}$ cents per lb. If he had bought it for $4\frac{1}{2}$ cents per lb. less, how many more pounds would he have received for the same money? Proc., 5; Ans., 5.

4. At 2 cents per centare, what is the value of 5 hectares of land?

Proc., 5; Ans., 5.

5. If 10 men can cut 46 cords of wood in 8 days, working 8 hours a day, how many cords can 36 men cut in 24 days, working 9 hours a day? By analysis. Anal., 5; Ans., 5.

6. B sold a span of horses to C and lost $17\frac{1}{2}$ per cent.; C sold them to D for \$550, and lost $16\frac{2}{3}$ per cent.? What did the horses cost B?

Proc., 5; Ans., 5.

7. Find the interest on \$327.45 for 1 yr. 1 mo. 1 da. at 9 per cent. per annum. Proc., 5; Ans., 5.

8. What is meant by each of the following expressions? (a) $\sqrt{64}$; (b) $8\frac{3}{4}$; (c) $\sqrt[3]{64}$; (d) $\sqrt[4]{66}$; (e) $(\sqrt{64})\frac{1}{2}$.

9. What will be the cost of a triangular pyramid of marble, whose altitude is 9 ft. and each side of the base 3 ft., at \$2.50 per cubic foot?

Proc., 5; Ans., 5.

10. Would you require pupils to commit and repeat the words of a rule in arithmetic before they understand the process involved? Give a reason for your statement. 5, 5.

GRAMMAR.

1. Correct: In our happiest hours, there is often some sad remembrance comes darkly over the the heart. Parse *there*. 2 pts., 5 each.
2. Punctuate: there is perhaps no surer mark of folly than to attempt to correct the natural infirmities of these we love. 10.
3. That the earth is round has been proved. Parse *that* and *proved*. 2 pts., 5 each.
4. Analyze the above sentence. 10.
5. Conjugate the verb *lose* in the participial forms. 10.
6. Decline *thou*. 10.
7. Write a sentence in which the predicate contains an infinitive mood depending on an adverb. 10.
8. Death erects his batteries right over against our homes. Parse *death* and *right*. 2 pts., 5 each.
9. Man desires not only to be rich but to be famous. Parse *only* and *famous*. 2 pts., 5 each.
10. Correct: The Society hold their meetings on Friday's. 10.

GEOGRAPHY.

1. If, with the present inclination of the earth's axis, the great mass of land were south of the equator as far as it is now north, what would be the condition of its inhabitants? 10.
2. What is Greenland supposed to be? Why cannot this be accurately determined? 2 pts., 5 each.
3. Name five chief food plants grown in the temperate parts of N. America. 5 pts., 2 each.
4. Upon what two conditions does the character of vegetation chiefly depend? 2 pts., 5 each.
5. In what does political geography differ from physical geography?
6. Name the largest three cities of Indiana in the order of their relative size. Locate them. 6 pts., 2 off for each one.
7. A foreign vessel reaches New York laden with rice, tea, cotton, silk, and porcelain ware; from what country did it probably come? Why? 2 pts., 5 each.
8. Which of the great powers of Europe has the greatest extent of sea-coast as compared with its territory? Which has the least. 2 pts., 5 each.
9. Which country of Asia is most nearly separated from the neighboring territory by mountain ranges? 10.
- 10.

Country.	N. Boundary	S. Boundary	W. Boundary	Capital
Peru.				
Spain.				

10 pts., 1 each.

HISTORY.

1. What class of topics in history is most important? 10.
2. What was the character and issue of the Seminole war, 1835? 10.
3. What was the first telegram sent in the U. S., 1844? 10.
4. To what important event did the annexation of Texas lead? 10.
5. What two States were admitted into the Union in President Polk's administration? 2 pts., 5 each.
6. (a) What led to the settlement of California? (b) In what year? a, 7; b, 3.
7. Name three important events in Pierce's administration. 2 off each one.
8. (a) Who were the candidates for President in 1860? (a) What parties did they represent? a, 5; b, 5.
9. (a) What was the Emancipation Proclamation? When was it issued? a, 7; b, 3.
10. (b) What is the use and value of historical charts in teaching history? 10.

NOTE.—Descriptions and narratives not to exceed six lines each.

PHYSIOLOGY.

1. Name two advantages resulting from the peculiar form of the spinal column. 2 pts., 5 each.
2. How can you prove that the bones are continually undergoing change and growth? 10.
3. What are the objections to violent exercise? Why can children bear violent exercise better than adults? 2 pts., 5 each.
4. Which is the more invigorating, sea-bathing or fresh water-bathing? Why? 2 pts., 5 each.
5. What two common articles of diet together constitute the most perfect and healthy food? Why? 2 pts., 5 each.
6. Upon what elements of the food does the saliva act? How does it affect them? 2 pts., 5 each.
7. Why are the arteries deep-seated, while the veins are so generally superficial? 10.
8. As carbonic acid is heavier than air, why does it not collect in such quantities near the ground as to destroy animal life? 10.
9. What rules would you give as to the care and preservation of the teeth? What as to the use of dentifrices? 2 pts., 5 each.
10. Why does a clot of blood on one side of the brain produce paralysis on the opposite side of the body? 10.

THEORY AND PRACTICE.

Write a page or more on the advantages of incidental oral instruction on such common phenomena as rain, dew, clouds, fog, snow, hail, the draught of chimneys, the rising of bread, etc.

NOTE.—The paper written by the applicant should be marked on a scale of 1 to 100. The number, value and correctness of the statements made should be considered.

ANSWERS TO STATE BOARD QUESTIONS FOR NOVEMBER, 1880.

IN SPECIAL CHARGE OF ANNIE M. SHERRILL.

The Number of the Answer Corresponds to the Number of the Question.

WRITING.

1. The small letters are one space in height and the capital letters three spaces.
4. Pupils as a general rule should not be allowed pen and ink before the age of ten, but circumstances may modify this. They should not begin to use pen and ink until they have acquired some degree of facility in handling a pencil.
5. The letter *b* is three spaces in height and one-half space in width. It is simply the letter *l* with a termination like the *v*. The distance between the crossing of the loop and the dot is equal to the width of the loop.—*Spencer*.

SPELLING.

1. *i* as in *marine*, *ea* as in *read*, *ee* as in *seed*, *ei* as in *deceive*, *ie* as in *siege*, *æ* as in *Phoenix*.
2. Time should not be wasted in spelling those words that are not likely to be missed by any of the class. It may, however, be necessary to call attention to their meaning or derivation.

READING.

1. In the phonic method the sounds of the letters are represented by different characters, the ordinary letter representing one sound and other characters invented to represent the other sounds of the same letter. The children are taught these characters and to combine them into words.
2. The purpose of the teacher in any reading class should be to make good readers. This implies not only elocutionists but excellence in the power of grasping the thought of the author. More attention should be paid to the cultivation of a literary taste in an advanced class. In a primary class pupils must learn to master *words* and the lessons given should be such as do not require any great effort of the mind to comprehend the thought. In an advanced class the pupils should learn to master the thought as well as the words and style.
3. 1. Where was the stag here spoken of? 2. What is meant by "his midnight lair?" 3. Where did the stag sleep? 4. What is meant by the sun kindling his beacon red on Ben Voirlich's head? 5. Where was the bloodhound? 6. What is the meaning of "bay"?
4. It is written with a regular measure and rhyme and also the author appeals to the imagination in his description of natural objects.

5. The second line is an adverbial element modifying "had drunk."
The fourth line is an adverbial element modifying "had made."

ARITHMETIC.

1. There are two theories regarding the quality of abstractness or concreteness.

1. The Dividend and Divisor are always similar numbers; therefore the Quotient must always be abstract.—Brook's Philosophy of Arith.

2. The Quotient may be either abstract or concrete.—French.

(a) It will be an abstract number when the Dividend and Divisor are both abstract or both concrete.—*Id.*

(b) It will be a concrete number when the Dividend is a concrete and the Divisor an abstract number.—*Id.*

Either the Divisor or the Quotient must always be an abstract number.

2. Dif. of Long.— 79° , $35'$, equivalent to 5 hr., 18 min. 20 sec. dif. o time.

If it is 5 A. M. at Paris, N. Y. being West, will have 5 hr., 18 min., 20 sec. later time—11 o'clock, 41 min., 40 sec. A. M., the day before.

3. $12\frac{1}{2}$ cts. $\times 23\frac{3}{8}$ = \$2.88 $\frac{3}{8}$ cts. = cost of amt. bought.

$12\frac{1}{2}$ cts. $- 4\frac{7}{8}$ cts. = $7\frac{1}{8}$ cts.

\$2.88 $\frac{3}{8}$ + $7\frac{1}{8}$ = $36\frac{11}{16}$ = no. lbs. he could have bought for $4\frac{7}{8}$ cts. less.

$36\frac{11}{16}$ - $23\frac{3}{8}$ = $13\frac{5}{16}$ lbs.

4. 1 Hectare = 100 Ares.

100 Ares $\times 100$ = 10000 Centiares.

5 Hectares = 10000 $\times 5$ = 50000 Centiares.

At 2 cts. per Centiare 50000 Centiares are worth 50000 times 2 cts. = \$1000.

5. Take 46 cords for the Base, because it is of the denomination required.

If 46 cords require 10 men for the given time, 1 man will cut $\frac{1}{10}$ as much, therefore divide the base by 10.

If 46 cords require 8 da., $\frac{1}{8}$ as much can be done in one day, therefore divide the base by 8.

If 46 cords require the days to be 8 hrs. long, $\frac{1}{8}$ as much will be cut working 1 hr. per day. Therefore divide the base by 8. The quotient will be $\frac{46 \text{ cords} \times 23 \text{ cords}}{8 \times 8 \times 10} = \frac{23 \text{ cords}}{320}$ = amt. of wood 1 man can cut in 1 da., working 1 hr. per da.

36 men working 24 da. and 9 hrs. per day will cut $\frac{23}{320}$ cords $\times 36 \times 24 \times 9$ = $558\frac{9}{10}$ cords.

6. Let 100 per cent.—Base—what C paid.

Then 100 per cent. — $16\frac{2}{3}$ per cent. — $83\frac{1}{3}$ per cent. — \$550.

If \$550. — $83\frac{1}{3}$ per cent., 1 per cent. — $\frac{550}{100}$ = \$6.60, and 100 per cent. — $\$6.60 \times 100$ = \$660, what C paid.

Let 100 per cent.—what B paid.

Then 100 per cent.— $17\frac{1}{2}$ per cent.— $82\frac{1}{2}$ per cent.—per cent. at which B sold,—\$660.

If \$660— $82\frac{1}{2}$ per cent., 1 per cent.— $\$8\frac{1}{2}$ —\$8.

And 100 per cent —\$8. \times 100—\$800, what B paid.

7. \$29.4705—Int. on \$327.45, at 9 per cent. for 1 yr.

2.4558 $\frac{1}{2}$ — “ “ “ “ “ “ 1 mon.

.0818 $\frac{1}{2}$ — “ “ “ “ “ “ 1 da.

32.0082 $\frac{1}{2}$ —Total Int.

8. The expressions should be read as follows: [a] The square root of 64; [b] $8\frac{2}{3}$ units or 8 units and two-thirds of a unit; [c] the cube root of 64; [d] the sq. root of the sq. root of 66 or the fourth root of 66. The square root of the cube root of 64, the $\frac{1}{4}$ power of 64 being its cube root.

9. 9 ft.—sum of sides of base.

$4\frac{1}{2}$ ft.— “ “ “

$\sqrt{6\frac{1}{2}} \times 4\frac{1}{2} = \sqrt{2\frac{1}{2}} = 1\frac{1}{2}$ —no. sq. ft. in area of base.

$3 = \frac{1}{2}$ Al.

$\frac{44.09 \text{ sq. ft.}}{8} \times 3 = 16.53\frac{1}{2}$ —no. cu. ft. in Pyr.

$\$2.50 \times 16.53\frac{1}{2} = \$41.3343\frac{1}{2}$ —cost of Pyr.

10. No; because it is not the natural or rational way to do. All rule in Arithmetic should be learned step by step by solving examples under the rule. The words of the rule thus have a practical force and meaning. Being thus naturally, and therefore pleasantly learned, they become assimilated knowledge, while a rule committed to memory may simply lie on the memory, of no more use or force than a piece of undigested pork on the stomach.

GRAMMAR.

1. *There*, is simply an expletive, having no other force than to introduce the sentence.

2. There is perhaps no surer mark of folly, than to attempt to correct the follies of those we love.

3. That, is often used to introduce a sentence which is the subject of a finite verb. In such cases, that, is a conjunction in form only, being really an introductory expletive.—Holbrook, P. 96.

Has been proved, is a finite verb having for its sub. the sentence, That the earth is round, with which it agrees in 3d. sing.

4. The above is a complex declarative sentence of which That the earth is round is the simple sub. unmodified, and is also a simple subordinate sentence, of which, the earth is the complex sub. of which earth is the simple sub., modified by the and round, two simple adj. elements of the first class, and is rounded is the simple pred. unmod. Of the leading sentence also, has been proved, is the simple pred. unmod.

5. Active Voice, Losing, Pres., Lost, Past, having lost, Perf. Passive Voice, Being lost. Lost, having been lost.

6. Nom. Thou, poss. thy or thine, obj. thee.
7. The room is large enough to accommodate all.
8. Death, noun, prop., 3d., sing., masc., nom. case, sub. of erects. Right, an adverb, limiting the prepositional phrase, [here used adverbially] over against our home.
9. The sentence expanded is, Man desires, not only [for him] to be rich, but [for him] to be famous. Only is an adverb, and limits to be [rich]. Famous is an adj. and limits him understood.
10. The society holds its meetings on Fridays.

GEOGRAPHY.

1. A land climate is colder in winter and hotter in summer than a sea climate. The northern hemisphere having the preponderance of land has greater variety of climate. As civilization seems to depend much upon climate, the condition of the inhabitants of the two hemispheres would doubtless be reversed were the land masses reversed.
2. Greenland is supposed to be an island, but this can not be accurately determined on account of the ice which prevents an exploration of its northern limits.
3. Wheat, maize, the potato, rice, rye.
4. Heat and moisture.
5. Political Geography considers the earth in regard to the actions of man upon its surface, and treats of man as races of beings their customs and manners, the governments under which they live, their social, religious and moral condition. Physical Geography considers the earth as fitted for the abode of man and treats of its physical configuration and the various phenomena of nature found upon its surface.
6. Indianapolis, Evansville, Ft. Wayne.
7. Probably from China because they are all products of that country.
8. England has the greatest extent of sea-coast in proportion to the territory and Russia the least.
9. Georgia.
10. Peru, bounded N. by Equator, E. by Brazil, S. by Atlantic O., W. by Atlantic O. Capital, Lima. Spain, bounded N. by Bay of Biscay and France E. by Mediterranean Sea, S. by Mediterranean Sea and Strait of Gibraltar, W. by Portugal and Atlantic O. Capital, Madrid.

HISTORY.

1. Those topics which discuss the causes and results of great events.
2. In 1835, a long and harassing Indian War began. The Seminoles inhabiting the interior of Florida, refused to move west, in accordance with a previous agreement. The Government sent troops to force their departure, but Oceola, their wily chief, baffled and entrapped the soldiers on many occasions. A detachment of 117 men under Major Dade, fell into an ambuscade and every man except one killed and he escaped only by feign-

ing death. This troublesome war did not terminate till 1842, when the defiant Seminoles reluctantly took their course westward.—Henry's School Hist. U. S.

3. In 1844 the first telegraph wires were erected from Baltimore to Washington City and on May 29 the first dispatch was sent across the wires, conveying intelligence of Polk's nomination as candidate for the Presidency.—Henry's School Hist. U. S.

5. Texas and Iowa. Florida was admitted the day before Polk's inauguration.

6. The discovery of gold in 1848.

7. [a.] A trouble arose with Mexico in regard to the boundary line. The "Gadsden Purchase" in which the U. S. paid Mexico \$10,000,000 and obtained 27000 sq. miles of territory south of the Gila River. (b.) By a treaty with Japan that nation agreed to open two of her ports of entry to the U. S. [c.] The Kansas-Nebraska Bill organizing the Territories of Kansas and Nebraska and giving the inhabitants the right to decide whether they should be admitted as slave or free states was passed in 1854.

8. The Republican party was represented by Abraham Lincoln, the Democratic party by Stephen A. Douglas, the southern wing of the Democratic party by John C. Breckenridge and a party calling themselves the "Constitutional Union Party" by John Bell.

9. On Sept 22, 1862 Lincoln issued his Emancipation Proclamation declaring that "on the 1st day of January, 1863, all persons held as slaves within any State or designated part of a state, the people whereof shall be in rebellion against the U. S., shall be then, thenceforward and forever free."

10. Historical charts are valuable as presenting the events of history in a connected and coordinate form thus not only assisting the memory but aiding in the understanding.

PHYSIOLOGY.

1. It combines great strength with ease and freedom of movement.

2. If an animal be fed madder, a red vegetable substance, the bones will be tinged red. After a time they will return to their natural color, showing that the particles are built into the texture of the bone and again torn down and removed.

3. There is a limit to the power of the human system either to endure extremes of cold or heat or violent action. Violent exercise causes a too rapid waste of the system and injury results, besides there is danger of rupturing delicate vessels or straining the muscles or tendons.

4. Salt water is stimulating to the skin and consequently more invigorating for the time. It is very apt to be over done, however, and injury results.

5. Milk and eggs contain all the ingredients necessary to the support of the system, yet we could not say that these would be the "most perfect and healthy food" for every body. The system requires food less concen-

trated than these articles are. Bread made from unbolted wheat, meal and fruits are the least objectionable articles of diet.

6. Saliva acts upon the starchy elements of the food converting the starch into sugar.

7. The arteries are deepseated so that they may be protected. An injury to any but the smallest arteries would very soon result in death. The larger veins are deepseated also for the same reason. An injury to smaller veins would not be so dangerous.

8. The "carbonic acid gas" or more properly carbonic anhydride is absorbed in great measure by plants. Also on the principle of the diffusion of gases it is distributed throughout the atmosphere, about .0004 part being constantly in the air everywhere.

9. The teeth should be kept clean with a soft brush and water. All so called dentrifices should be avoided.

10. The different impulses which are transmitted through the spinal cord from the body cross each other in the medulla oblongata, consequently an injury to one side of the brain produces paralysis on the opposite side of the body. See Huxley & Youman's *Physiology and Hygiene*, p. 307.

THEORY AND PRACTICE.

A knowledge of the common phenomena here mentioned should form a part of the education of every individual. Children can very easily be interested in such matters and much valuable information may be acquired by them from oral instruction given by the teacher. Aside from the mere information imparted the minds of the children will be aroused to think for themselves and not only to think but to observe the phenomena of nature. Such instruction should be given in the morning and if properly managed may be made one of the best means of preventing tardiness.

COLLEGE DEPARTMENT.

DEVOTED TO THE INTERESTS OF THE CENTRAL NORMAL, DANVILLE, INDIANA.

Dear Friends:—It is natural to boast when one has something to boast of. It is not only natural but it is right. Shall we be censured for being proud of Our School, THE CENTRAL NORMAL COLLEGE and boasting of its merits. The Central Normal is located in the central part of Indiana. It has during the past year enrolled OVER 100 PUPILS FROM OHIO, AND NEARLY AS MANY FROM ILLINOIS. Why is it, we ask? Certainly not because there are not State Normals nor private Normals in those States. These pupils recognize THE FACT that the Central Normal has added more new features, has greater general facilities and a stronger aculty. They prefer VIGOR and STRENGTH to age and official patronage.

They prefer a faculty, every member of which is interested in every pupil of the school, and whose positions depend upon the quality and quantity of their work, to one which is living on the reputation of a past record or supported by endowments.

Let no young man or young woman go away to school without first investigating the workings and results of this first class vigorous institution.

Pupils come here not only from the very shadows of well known institutions in other states but from every county in Indiana a state noted for its Normal Schools and colleges. They might save rail road fare and tuition, even, by going to some other institution but they learn that the best is the cheapest not only because it is the best but because the rates of board and lodging and tuition are placed down to the lowest living figures.

PROF. A. C. HOPKINS will begin work again in the Central Normal Jan. 18, 1881. Prof. Hopkins is well known as one of the leading Educators of Indiana. Having filled the high office of Superintendent of Public Instruction and having had years of experience as an Indiana teacher he has an acquaintance with the educational interests and history of the country that is very valuable to this Institution. The Prof. needs no introduction to Normalites as he is one of the most popular teachers ever in the school. And he is one of the most scholarly, genial and jovial teachers that ever entered an institution of learning. Look out for a boom in MUSIC AND CIVIL ENGINEERING.

We are happy to announce that we have finally secured the services of the first elocutionist in the west and one of the best in his profession in this country, to take charge of this department of the work in the Central Normal. We are ready to assure the students who contemplate study in this art that never before in the history of any Western School has such an opportunity been offered.

At a great outlay of money we have made arrangements so that all students who desire it may avail themselves of instruction in this branch without extra cost unless they desire to take special instruction in private classes.

Prof. G. Walter Dale, Author of "The Outline of Elocution and Comprehensive Manual of Principles" has become one of the regular members of the faculty and will begin his work Jan 18. We look upon this as an acquisition of great importance and desire to impress upon the minds of students that we feel that we offer advantages in this field of special work second to no School in the United States.

Abundant opportunity for appearing before audiences will be given the students, enabling them to acquire that confidence that will make their work of practical value. Students who pass through the course now outlined with careful study and attention are assured that they will not only be able to teach Elocution as a specialty but to read in public with acceptance and success.

The engagement of Professor Dale completes the design we have been

elaborating for years—the formation of the strongest faculty in the West. Now for news from Normalities.

M. T. Maze, "a mighty maze but not without a plan," writes from Sharpsville, Ind.: "I send you a word in regard to the Central Normalites in Tipton Co. We are all getting along nicely. Normal students have no trouble to get schools in this country. The reason is they are live energetic teachers." Mollie Ballard is at North Salem, Ind. S. N. Brown is at Fincastle, Ind. He signifies his intention to take the Scientific course next year. Jos. H. Blasdel writes from Guilford, Ind. He is teaching a school of 30 pupils devotes one night in a week to a class in penmanship. He says, "I am pleased to learn that the Normal is prospering so finely. I hope it may continue to grow in numbers and in interest as it has in the past." V. D. Carmony is teaching at Conover, Ohio and succeeding. Expects to return to the Normal. Geo. E. Hoover of Hooverville Pa., writes hoping "the good old Normal is still progressing as ever." We are happy to answer, "yes." S. C. Dimm is teaching near Pittsboro, Ind. W. S. Porter is having a good school at Milner Corner, Ind. T. L. Eads is traveling and lecturing. He writes from Olney, Ill. Says "I have had the pleasure of meeting with many of the Illinois cousins. Dollie Bunting, Mary and Maurice Willis and J. D. Neyswander are teaching. I have visited each of them at their school rooms. They are thorough Normalites and are making their work a grand success." M. J. McGrew is teaching in the Northern Kansas Normal College.

About two hundred personals are crowded out of this issue; a part of them will appear in our next. The news from our old students gratifying and glorious.

PUBLISHER'S DEPARTMENT.

—Read all the advertisements.

—Read our announcement of Good Books for All and give us an order.

—We again call attention to the advertisement of the Universal Bath. It is all that is claimed for it.

—We call special attention to the advertisements of the Normal Schools in this issue. We believe these Institutions to be the foremost in the land, every one of which has an able faculty and is doing good work. If you desire to go to school you should investigate the merits of these Normals.

—All names are dropped from our list when time expires. If you do not wish to lose any copies of *THE NORMAL TEACHER* you should renew promptly.

—Now is the best time to sell our books. Schools are in session and teachers have money. Our books are in great demand. We desire agents in every county now. Our terms are liberal. Write us for an agency.

—The Normal Speaker is not yet out. It will be yet some two weeks or more before it will be ready for delivery. We have delayed the work in order that we may be able to make it more complete. We are determined that it shall be all that it is advertised to be. Those who have subscribed for the work at 25 cts. per copy will not mind waiting a little longer as they are getting a bargain. Please do not write us about the book as it will be mailed just as soon as possible. Save your time and postal cards.

—There is no finer teacher of Elocution in the West than Prof. G. Walter Dale. He will teach classes in the Central Normal School during the spring and summer sessions. Those who desire to study Elocution can not do better than to attend this school. His new work, *Outline of Elocution and Comprehensive Manual of Principles*, now in press, is the leading work on the subject. We hope that every one of our readers who has any interest in the subject whatever will take advantage of the offer made elsewhere to secure a copy for \$1.00. You can not invest a dollar to a better advantage.

—21 NUMBERS OF SCRIBNER'S FOR \$5.00. The richly illustrated November number of *Scribner's Monthly*, the Decennial Issue appears in a new cover, and begins the twenty-first volume. The increasing popularity of the magazine is strongly evidenced by recent sales. A year ago the monthly circulation was about 90,000 copies; during the past nine months it has averaged 115,000, while the first edition of the November issue is 125,000.

The first Part of the now famous serial by Eugene Schuyler, "The Life of Peter the Great," was finished in October. With November begins Part II., "Peter the Great as Ruler and Reformer," which will be an advance, in point of popular interest and wealth of illustration, upon the part already published. To enable readers to secure Part I. the publishers make the following special offers to new subscribers after October 20th, who begin with the November number.

(1.) New subscribers may obtain for \$5.00, *Scribner's Monthly* for the coming year, and the previous nine numbers, February to October, 1880, which include Part I. of "Peter the Great," Mrs. Burnett's "Louisiana," etc. In accepting this offer, twenty-one numbers will be had for \$5.00.

(2.) They may obtain the previous twelve numbers of *Scribner's*, elegantly bound in olive-green cloth, two volumes, containing Part. I. of

Peter the Great, all of Cable's novel, "The Grandissimes," with the numbers named above, and a year's subscription, for \$7.50. Regular price, \$10.00.

All book-sellers or news-dealers will take subscriptions and supply the numbers and volumes mentioned in the above special offers, without extra charge for postage or express; or the publishers, Scribner & Co., 743 Broadway, New York, may be addressed direct. The regular price of Scribner's is \$4.00 a year, 35 cents a number.

—St. Nicholas for 1881. 5000 for England, 100,000 for America. St. Nicholas, the charming magazine for boys and girls, edited by Mrs. Mary Mapes Dodge, has increased so much in size and number of pages during the year past that the publishers have been obliged to issue the yearly volume in two parts, instead of one as heretofore. As to its circulation, they report a gain of 10,000 in the average monthly editions of 1880 over 1879. The announcements for the coming year include a capital serial story for boys, full of exciting adventure, "In Nature's Wonderland," or, Adventures in the American Tropics; Stories of Art and Artists, by Mrs. Clara Erskine Clement, a faithful outline of the history of European Art, with many illustrations; "Phaeton Rogers," a delightful and humorous serial by Rossiter Johnson; "Mystery in a Mansion," a six months' serial; The Treasure-Box of Literature, directing and encouraging young people in the best reading; The Agassiz Association, fully explained in the November number; "Two English Queens," by Mrs. Oliphant; "The Land of Nod," a children's operetta, with music,—full of charming tableaux and effects; A series of beautifully illustrated Ballads for Young Folks, beginning with the Christmas number; A special Budget of Fairy Stories by Frank R. Stockton—the first of which is in the November number; An Indian Story by "Bright Eyes," the Ponca Indian maiden; a splendid holiday story, "A Christmas with the Man in the Moon," by Washington Gladden. Open-air Papers, stories of sports, and games, will be continued, with all the popular departments.

Subscriptions beginning with the November issue will include "the wonderful Christmas number," of which the edition will be 5,000 in England and 100,000 in America. The price of this number, to be issued about November 30th, will be 30 cents.

Regular price \$3.00 a year; 25 cents a number. For sale, and subscriptions received, by all dealers, or the publishers, Scribner & Co., 743 Broadway, New-York.

—Send in your name and One Dollar and secure a copy of Prof. G. Walter Dale's *Outline of Elocution*. Reasons why you should do so:

1. Because it is the best book on the subject in the English language.
2. Because it is the finest self-instructor ever prepared upon the subject.
3. Because the selections are the choicest in the whole realm of Elocutionary Literature.
4. Because it is the most philosophical analysis and concise and explicit exposition of Elocution to be found in print.
5. Because it is written in a style that will interest you while you read it.
6. Because it contains twelve appended essays that are not to be found

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KANSAS NORMAL COLLEGE

DEPARTMENTS:

Preparatory,
Teachers',
Business,
Scientific,
Classical,
Musical,

EXPENSES:

Tuition, eleven weeks, \$8.00
Tuition, Institute term, 1.00
Boarding, per week, 1.50
Room Rent, per week, .50
Books, per term, .10
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The third year opened Aug, 31, with an increased attendance. A new building, the gift of the citizens of Ft. Scott, is now ready for use. This act shows they have confidence in the school and are determined to promote its growth.

Reasons of its Popularity and Success.

1. The courses of study of this institution are adapted to the needs of those intending to teach, and prepare them for the actual duties of life in any pursuit.
2. The instructors are chosen for their peculiar fitness for the positions which they hold, and never fail to rouse the *energy* and *interest* of their students.
3. No vacation between terms. Students can enter at any time and choose their own studies.
4. Graduates of the school are successful in whatever they undertake.
5. Normal ideas are in demand. The school is in unison with the spirit of the age.
6. The school is *non-sectarian*, and is the **ONLY** Normal School in the West supported by independent private enterprise. It stands on its own merits.
7. The work done is thorough. There is no need of spending six years learning what may be acquired in half the time.
8. Expenses are brought within the reach of all.

CALENDAR FOR 1880-'81.

First Spring Term opens Feb. 1, 1881.

Second Spring Term opens April 18, 1881.

Summer Institute opens July 5, 1881.

Third Annual Commencement occurs July 28, 1881.

Catalogue Sent Free on Application.

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THE NORMAL TEACHER.

An Educational Monthly.

VOL. III. DANVILLE, IND., FEBRUARY, 1881. No. 12.

J. E. SHERRILL AND R. HEBER HOLBROOK, EDITORS.

BUSINESS NOTICES.

Persons ordering a change in the direction of **THE NORMAL TEACHER** should always give both the *old* and the *new* address IN FULL. No change can be made after the 12th of any month in the address of **THE TEACHER** for the following month.

New subscriptions will always begin with the first issue of **THE TEACHER** after they are received unless otherwise directed.

In sending stamps to this office send only of 1-cent denomination.

OUR PLATFORM.

DEFINITIONS.

Teaching is a *process*, controlled by *principles* aiming at *products*.

The Process of teaching is the training of the growing mind.

The Product aimed at by this process is the power of self-improvement.

The Principles controlling this process make it systematic.

TEACHING, then, is the systematic (principles) *art* (process) of training the growing mind toward the power of self-improvement (product).

DIDACTICS is the *science* which treats of the *principles* of teaching.

AXIOMS.

AXIOM OF ACTIVITY. The mind is *inherently* active.

AXIOM OF IMPROVEMENT. The mind is *inherently* improving.

POSTULATES.

Postulate of Influence. The mind can be directed.

Postulate of Increase. The mind can be stimulated.

EDITORIAL.

CONDUCTED BY R. HIEBER HOLBROOK, ASSOCIATE PRINCIPAL
NATIONAL NORMAL SCHOOL, LEBANON, O.

A noted manufacturer in this country, who has 3,000 men in his employ, says: "I never allow myself to speak harshly even to the poorest boy among my work-people. It does not pay. I have tried kind words, without exception, for years, and the results have been admirable."

How many teachers can say as much? Yet what is thus certified to by the manufacturer *could* be quite as real an experience with the teacher. Let it not be supposed that this man failed to tell an employee his duty, nor that he pointed out failure to perform such duty, nor that he didn't reprimand. He used "kind words" without exception. Kind words are not weak words, lazy words, careless words, indifferent words, cowardly words, coaxing words, cajoling words. Energy, authority, and even a judgment to punish-ment may be clothed in kind words.

The London *Times*, commenting on the prosecution of Dr. Buchanan, in Philadelphia, for forging medical diplomas, says: "Our ancient universities have sinned quite as much as he in making degrees a mere matter of money. Many thousands of men add M. A., D. D., or D. C. L. to their names without having answered a question, or shown any scholarship or knowledge over and above what is implied in a B. A. degree."

Are *our* respectable colleges and universities above a dignified, high-toned suspicion, in this matter? Do they not accomplish for themselves some cheap advertising, the equivalent of which would cost *money* to a private normal school? The grand difference between some colleges and normal schools is the one can beg and be respectable, though

they die; the others must pay and hardly be respectable (with beggars) though they thrivingly live. There is so much in "style" in this aristocratic America!

The worst late calamity to education in the West, which we are called upon to record, is the withdrawal of Prof. W. H. Payne from educational editorship. His writings have given the Educational Weekly a character for strength and warmth unsurpassed by any paper in the country. We are sure, though, the misfortune will be a short lived one. His great, practically philosophical ability in this direction will certainly not go long unutilized.

The Burnside Bill establishing a National Educational Fund has passed the Senate. We give a synopsis of it in another place. We solemnly warn every person within our reach against this bill. In fifty years it will be a more terrible incubus than our present Indian Policy, which was also founded in benevolence, but which is now a stupendous and therefore an ineradicable fraud.

SOME POINTS FOR YOUNG TEACHERS.

Discipline.

1. Speak to a pupil seven times, *privately*, before you punish him.
2. Punish him privately seven times before you make a public culprit of him.
3. By this time your patience and fairness will be established and the sympathies of the pupils will be strongly with you.
4. Reprimand publicly seven times before you punish publicly.
5. Punish publicly seven times before you suspend a pupil.
6. Between these times consult with parents and familiarize yourself with the home conditions.

7. This may modify your judgment and awaken your sympathies.

8. Suspend a pupil seven times before you expel him.

9. Admit him always on his promise to you to do better.

10. Never require a pupil to make a public apology. In a majority of cases he will not know what to say. If he is mean he will lie in doing it; if he is manly he will, we had almost said, die in doing it.

11. When you do expel, make it an impressive matter by having the school trustees present and by giving a full account of your continued efforts in his behalf, his persistent incorrigibility, your hesitation and sadness at being compelled to deprive him of the most precious privilege he enjoys, the school; finally, pronounce judgment in serious, subdued tones, commanding the boy to take his books, leave the room and not return during this term, giving him to understand that all is done with the knowledge and sanction of the trustees.

12. Such a scene should not occur *more* than once in one term. It should not occur once.

STAND FIRM.

Teachers, like preachers, are too sensitive. If Huxley or Tyndall squint toward religion, theologians fairly bristle. If a supposed enemy or ignorant friend comments adversely on the public schools, educators get the tremors. Seeing this, literary hacks, who are paid by the column for their dirt, do not fail to make the best of the opportunity thus afforded for a sensation. Having discovered a "game" in the "school question," they proceed to "work it up" with a zeal characteristic of such persons.

While educators, much to the disgust of sensible people and to amusement of the Bohemians, doubtless, have been driven into an attitude of chronic defense. Too many of the educational journals are with servile hats, bowing apologies and putting sniffing I-didn't mean-tos and we-won't-do-so-

again into dignified editoria's. All of which we look upon as not only unfortunate for the cause, but belittling to the profession.

There is no practice of teachers so humiliating as that of seeking wisdom from every garrulous interloper upon their proceedings and paying humble respect to every narrow-minded old-fogy that is mean enough to abuse them.

The public schools need no defense. Where they are right, let us say so. Where they are wrong, let us say so. To claim they are perfect is folly. To assert they are utterly bad, is worse than folly. To admit they have fault is good sense. To right them where they are wrong, is what every teacher is eager, even anxious to do—as every sensible person knows.

Three principal charges are made against the schools: They are too mechanical; they are too expensive; they unfit youth for practical life.

To the first we have to say: It is true. No one knows it better than teachers themselves. But the fault is not in the schools or in the system. It is in the teachers. System is necessary, inevitable; poor teachers are not. The better the system the better the teachers required to work it. The best system will soonest dominate a weak teacher. A strong teacher alone can resist and dominate a vigorous system. This is just as true of superintendents as of subordinates. School boards are disposed to think that a good system can be run by cheap teachers, whereas the better the system, the greater the injury it will effect with poor teachers. The remedy for all this is better teachers. Better teachers will come with better pay. Teaching brains cost, just as any other brains.

Ergo, dear public, stop whining, put your hands into your pockets, and produce that which, and which alone, as you well know, will cure the evil. Pay good prices and your schools will be good. Pay for brains, too. Do not pay high prices for bricks and then try to economize on brains, as you are now doing.

The schools are too mechanical, we admit. They are so because they are cheap. They are cheap because the public so wills. The truth of the charge is not denied. The responsibility for it though we, as teachers, respectfully decline to assume, and therefore we do not defend or excuse,—on the other hand we accuse you, dear public, and claim that you are the offenders and we the sufferers.

Another matter in this connection. The school systems will be bad as long as school boards make the schools a species of alms-house where unfortunate widows and needy relations are maintained at public expense. When it is remembered how many not competent but needy teachers are annually elected by hearts instead of heads, it will not be at all surprising that the schools are mechanical. Now, honor bright, dear public, is it quite just to blame teachers and systems for this weakness? You are the guilty party. You elect your school boards—teachers do not. You encourage them in this favoritism and eleemosynary weakness. Every superintendent in the land would cut it out as fatal gangrene. You are the culprit, your teachers and your schools the sufferers. But instead of manfully acknowledging it, you try to cloak your guilt by sneaking into the papers and raising a stop-thief cry of abuse of the schools. Think you that we will gratify you by defending ourselves against your insults? We make not a single excuse, we accuse. The schools are not to blame, the teachers are not to blame. Nor are the school boards to blame. The sin is upon an indifferent, lazy, fault-finding, corrupt public. We fling your charges back upon you, dear accusers.

Again, it is said the schools are too expensive. We deny it, point blank, and charge back upon you, dear public, that you are mean and parsimonious in the payment of your teachers, and to this meanness and parsimony is mainly due the insufficiency of your schools. Every just person knows the truth of this. Compared with any other public officer, and taking into consideration the ability and duties required, the teachers are paid disgracefully low prices. The laziest

and most incompetent teacher in the schools more than earns all he is paid, as compared with the average county officer.

While there has been much spent on buildings and wasted on architectural "jobs," most of which has been since "saved" from teachers' salaries, we maintain that too much has not been spent on school buildings. A majority of the school children to day are being taught in miserable dens compared with the quarters of county officers and of criminals, paupers, the insane and idiots. Why these classes are entitled to more elegant surroundings than the teachers and the children of the best people of the land, we do not and will not understand. They are not. If court-houses are carpeted, school-houses should be. If county officers are entitled to walnut furniture, cushioned chairs and stationery free, teachers are entitled to the same. If retrenchment must be, it should be upon the thousands of state, county and township officers and offices and nameless other government expenses—not upon the schools and teachers. Ah, dear public, you claim to be so enlightened, so friendly to education and progress, yet when hard times come, you starve and grind your teachers, first and only, while other public expenses are too sacred to touch. Other officers enjoy their extravagant salaries and fat perquisites, without a murmur from you. Isn't there a shade of hypocrisy as well as injustice in this? But this is not all. You go on from hypocrisy and injustice to meaner meanness by trying to charge upon us teachers the responsibility for failure in things for the accomplishment of which you do not supply decent remuneration or necessary facilities. But this is not all. To this injury you add the insulting demand that teachers shall not only bow and scrape their acknowledgements to you for their present meagre requital, but they must beg, and cringe, and wire-work, and bribe to prevent you from robbing them of the contemptible pittance you have grudgingly allowed them from your untold abundance. We do not defend, or excuse, dear public. We accuse, nay, we

denounce you, not from unworthy or spiteful motives, but because we are right and you are wrong. We are the sufferers, you the unrighteous cause of our suffering.

Again, it is said the schools unfit children for the lower walks of life, making them discontented with humble pursuits and encouraging them to crowd the more respectable avenues of employment.

For shame, dear public, for shame! What is it, you ask? Would you have us teach your children that they are inferior and must remain so? that they are filthy and must be filthy still? that they are naked and must never hope to be clad? that they are ignorant and knowledge to their eyes, "her ample page, rich with the spoils of time" must ne'er unroll? that they are poor and should never dream of being rich? that they are of humble rank and should never aspire to anything higher? Have you provided us any text-books in which we can assign such lessons? Have you any history from which we can draw such sentiments? Do the lives of your great men furnish such teachings? Does your literature supply such anecdotes? Does the unparalleled growth and development of your nation point such a moral or adorn such a tale? Again we cry out: For shame!

Consider who you are, dear public. What is your origin? Whence your rank, your power, your wealth, your intelligence? During the last century thousands of emigrants have poured upon our shores. The majority of these were from the lower, poorer, and more ignorant classes of Europe, where had they remained, their children would to-day have been dragging out the miserable existence their fathers escaped by emigrating. Dear public, these were your parents. You are their children. This would have been your sure fate. But how different! And why? Because of the public schools. You have become wealthy and aristocratic, and fat and fussy, and possibly envious, perhaps alarmed, lest "upstarts" shall displace your children as you did some one else's. You take on great airs about people of humble circumstances who are ambitious to reach the

higher walks and against the public schools that encourage them to it.

Because a hired girl will not be crushed by one of your snobs, finding out that she has been in the public schools, he proceeds to denounce and abuse them in a respectable monthly for unfitting girls to be servants, whereas that same snob would probably find out, by further inquiry, that his mother was once a servant, but saved him and his sisters from a similar fate by sending them to the public schools, which gave him sufficient education to vilify them in a high-toned journal for blessing others as they blessed him.

If a committee of these snobs will devise a school system to suit their purposes, that is, that will train Americans who *are down* to stay down so that they and theirs who are *up* may stay up, we predict, that in order to use it they will have to emulate their poor ancestors in one regard, namely: They will have to emigrate. Such a system would suit aristocratic Germany or England, but America, never.

This is one charge, dear public, we confess to. We assume the whole responsibility. We make it our proudest boast. We do unfit the masses for servile drudgery by trying to inspire in their every heart a noble, holy ambition to excel, to improve, to strive for the highest and best. Such teaching produces a Lincoln who steps from his rails above an Adams.

In asking anything else of us you are traitors to every sentiment of your institutions. You shallow, shoddy public! You besotted, selfish snobs! You snappish, disappointed female politicians! You bigoted, stall-fed, literary swells! Think you that teachers or the friends of the schools will waver because of your high-priced snap-judgments? They should not argue with you—they should strike you. You merit not reason, but rebuff. To debate with you is toadyism, cowardice. Saying this is not mere brava-do. It is justice, because you are disastrously wrong, and we are grandly right; and immense, immortal interests are at stake.

IS EDUCATION A SCIENCE ?

(Continued).

(35). In the development of any Science, the qualitative stage invariably precedes the quantitative.

(36). During the quantitative stage relations or properties are classified, while during the qualitative they are measured or expressed abstractly in terms of some assumed units.

(37). The classification of relations is the unification of these relations, with reference to their origin, or with reference to antecedent and consequent.

(38). Having examined the subject-matter of two leading mathematical Sciences, let us now consider two typical Natural Sciences.

(39). Natural Philosophy is a very indefinite term, expressing a group of Sciences, but as it is the popular designation in a majority of our text-books of a somewhat determined body of truth, it will answer the purpose of our present illustration.

(40). The difficulty one experiences in attempting to state the subject-matter of this Science is the best indication of its un-scientific character. Is it the extrinsic properties of matter, is it motion, is it force, is it machinery, is it the molecular motions, heat, light and electricity?

(41). Now, if Natural Philosophy were a clearly defined system of truths, the area of its investigations would not be thus ill-defined and scattered, the tendency therefore, as it progresses, is to fix limits by defining subject-matters. So that, now, instead of Natural Philosophies we have distinct text on Mechanics, Optics, &c., &c.

(42). These new works simply indicate a more complete unification of the properties and relations involved. Each text treating upon a group, formed by reason of some common similarity.

(43). Let us notice now the character of this progress. At first, Natural Philosophy was a mere collection of truths with reference to matter, motion and force, exhibiting little order or system in their statements.

(44). Further investigation of these truths lead to a better arrangement of them and introduced groupings, or classification.

(45). Where the practical demands of life have required it, certain phenomena have been especially studied and have reached the quantitative stage; for instance, the lever, motion, weight, light, heat, &c., &c. The law of gravitation was but the qualitative statement of a quantitative phenomena. It is simply a proportion whereby units may be applied to that force. The laws of the machines, of light, sound, hydrostatics, &c., are all so many proportions which make an arbitrary unit the means of expressing quantities of the different phenomena.

(46). But notice what a heterogeneous, ill-assorted mass of material is still in our Natural Philosophies. See how muddy and illogical are even our latest treatises on the subdivisions of this subject. Do we as a consequence hesitate to call it a Science, because the rigor and beauty of the mathematics are considerably absent?

(47). Yet there are departments of this science which are assuming a mathematical rigor. Newton in his *Principia* cast much of it into this form. His genius penetrated the incoherent inexact facts and generalized to laws all of which are theoretically correct, none of which is practically exact.

Long before him, Archimedes divined the abstract ideals of Statics and Dynamics which to-day are the foundations of all the scientific rigor of which these sciences are capable.

(48). Let it be noticed that the abstractions of these physical sciences are not unlike those of Geometry—in that they are exact only in theory, never in practice; yet are the necessary data of all exact reasoning.

(49). For instance, as line, surface, volume, &c., are abstractions impossible to *realize* in practice, yet indispensable to all reasoning, so, for instance, the lever and its law are impossibilities in practice. There never was such a thing as a mathematical lever; nor was there ever a lever to which the law of the lever was exactly applicable. Real levers are never more than *approximations* to the ideal lever.

(50). The abstractions of both Geometry and Physical Sciences could be regarded as impossible, inconceivable absurdities, yet they are the *necessary* starting points of all quantitative deductions.

(51). This anomaly is so familiar to us in these departments, and has so long carried the stamp of such respectable and unquestioned authority, it is next to impossible, by calling attention to them, to awaken mistrust in their applications.

(52). Let us now anticipate, a little, in regard to educational science and lay down a canon with regard to its abstractions. All the fundamental abstractions upon which a science of education is to be built, will be exact only in theory, never in practice. As the real lever is an ever approximating one, but never perfect one, so the real phenomena of educational science will ever approximate to, but never reach the exact abstractions which must form its foundation.

(53). When authority and time have determined and fixed these abstractions, they will be no more liable to disturbance than are the familiar abstractions, line, levers, falling bodies, light, &c., &c.

(54). Concerning Natural Philosophy we conclude that its subject-matter is so complex and ill-defined that it is truly scientific only in spots as it were, and much of the body of truth which for which it stands is in a very chaotic, unclassified condition, while portions of it have attained the quantitative stage, and can be expressed with mathematical rigor.

(55). We do not therefore reject it from the Sciences, but engage the more earnestly, first, in verifying its phenomena

with reference to cause and effect, and, second, in applying to them units whereby they may be more thoroughly reduced to a quantitative condition.

(56). We come now to Physiology. Is it a Science? Our conclusion is easily anticipated. The subject-matter of Physiology is the Human-Body. Could there be a more complex phenomenon? It involves all nature, in a sense. Inanimate and animate phenomena are here united and lead on to the most complex and difficult of all phenomena—the intelligence, the soul.

(57). When we consider of how much greater practical necessity to human existence is the lever than the muscle, or even the intelligence that wields it, we can readily understand why the phenomena of Physiology are comparatively new as subjects of human study.

(58). Again, since the study of these phenomena is clearly in its youth, we should expect that the Science would be yet in its qualitative stage, and that the unification of its phenomena would be the engrossing object.

(59). When the relations of food, heart, blood, nerves, mind have been sufficiently investigated, and, as so many causes and effects, are approximately understood; when units of food, units of muscular action, units of nervous power, units of intelligence have been assumed and their laws of relation and inter-relations abstracted and affirmed; Physiology will then have reached a quantitative stage.

(60). Strange as it may seem, this stage is more nearly reached by stock-dealers, gymnasts and pugilists than by Scientists. The feeding and clothing of armies is helping to give it some practical impetus.

We have now investigated very briefly, the characteristics of a few Sciences as Sciences, let us proceed to make application of our conclusions to the solution of our question—“Is Education a Science?”

(TO BE CONTINUED).

EDUCATION AND TEMPERANCE.

W. H. VENABLE.

He who is by practice a "temperance man" exercises complete mastery over himself. He does not ignore or destroy the powers and susceptibilities with which he is born, but he puts them all to proper use, and suffers none to become perverted. He does nothing unreasonable. He eats and drinks with moderation, and, to secure perfect health; regulates his passions and emotions, compelling them to serve him, and never permitting them to enslave him. He marshals all of his faculties for the most effective work, causes them to cooperate harmoniously, subordinating body to soul, and soul to the law of God.

In this comprehensive sense, few men come up to the standard required by Temperance. We have all gone astray. We are all guilty in some degree of excess or dissipation. We are remotely and in some measure responsible for the excess and dissipation of others. Whoever sanctions the prevailing sensualism of the times encourages drunkenness. The inevitable tendency of our fast modes of living is towards abuse. Let us, then, seriously inquire whether our system of society, itself, can be improved. How shall we prevent dissipation, excess, drunkenness, lust, in the years which are to come? What can we do to save the coming generation from the curse of intemperance, and attendant evils, and, again, what can we do to cure these repulsive diseases as they now exist.

Let us first consider the means of prevention. These are numerous and varied. Their efficacy, in the main, depends upon their early application. We must begin with the children. In reference to the nurture and training of young children we may derive some valuable suggestions from the ancients, particularly the Greeks, who bestowed

much thought upon the subject. Plato's scheme of infant education even anticipates birth, and prescribes strict rules to secure health and moderation on the part of mothers. Aristotle recommends that children be fed on plenty of fresh milk without admixture of wine; that they be regularly bathed and frequently carried in the open air, and dandled by their nurses. Absolute cleanliness and abundant exercise are quite essential to the vigor of babies. When the children grow older, scrupulous attention should be given to their diet. Their food should be plain and wholesome, carefully prepared, and palatable. It should be taken at regular intervals. No stimulants should accompany it except as medicinal aids. Tea and coffee should be withheld. The children should be taught to chew their food thoroughly and to eat slowly. This is a rule of vital importance, and by no means easy to enforce. The next requisite to wholesome diet is refreshing sleep. Children should go to bed early—as soon as it is fairly dark—and should become accustomed to get up immediately upon waking in the morning. Sleeping apartments should be comfortably ventilated. Impure air is as injurious as bad food.

The young require active employment. No tendency to lethargy and listlessness, or indolence ought to be indulged. *Ennui* in a child is deplorable. Healthy girls and boys should be busy and happy all day long. Their surplus energy must find vent in harmless channels. Out door exercises are very desirable. Plenty of invigorating play is the best tonic for youth. Energetic play is the natural preparative to earnest labor; and a taste for labor should be cultivated as early as the strength of the child will permit. I say a taste for labor; believing that the performance of work is, and ought to be considered, pleasant and not painful. The individual who has never discovered that downright hard work of body or mind or both is one of the chief sources of human delight, has not made the best use of life's blessings. Many thousands of bright boys and girls suffer an irreparable injury in not being taught to work. The

wealthy father who permits his son to live in easy idleness, thinking that the fortune he has in store for the youth will make personal exertion unnecessary, is unwittingly an enemy of the son whom he lives to benefit. The indulgent mother who keeps her pretty daughters' hands white and soft by withholding them from the broom handle, though she means well, is defeating the great object of family training; which should aim to impart to the children habits of self-helpfulness and industry. The mind should be taught to work no less than the hands. Neither body nor mind must be overtaxed. Systematic habits should be enforced, and sometimes with vigor. And yet unnecessary restraints must not be applied. The child must be taught and trained but not sacrificed to an arbitrary routine of mechanical regulations. Everything must not be done for him. His own nature must be respected, and his inborn faculties must be allowed a reasonable freedom. He must learn self-respect and exercise self-reliance and self-restraint. His own sense of personal responsibility must be brought out. Those children who have been governed too much by merely external measures, without having learned to consult their own reason and conscience, often go astray when the restraints to which they are accustomed are removed. It is necessary, indeed, that the young should submit, to the wisdom and authority of their seniors; but it must not be forgotten, that, if they ever become a law unto themselves, they must begin to practice self-government long before they are released from parental control. The very best family government is that which induces the child to govern himself by the rule of right.

It cannot be presumed that parents who are themselves very ignorant or vicious, will take such care of their children as I have indicated. What then shall be done for the children of the ignorant and vicious? The great hope of temporal salvation for them, must be the common schools. The teacher, in the place of the parents must educate the young, in such a way as to qualify and equip them for the

campaign of life. Therefore it behooves every good citizen to take an interest in the common schools. Above all, competent teachers should be secured. Everything depends upon the teacher. Even a poor school system will produce satisfactory results in the hands of excellent teachers. We want good teachers and a good system of education also. But both together will not effect the highest results without sufficient time for them to operate. Young folks should go to school longer, so that they may develop soundly and thoroughly. Haste makes waste in education as well as elsewhere. You cannot force the growth of mind beyond a certain limit. Distinctively moral instruction should be given systematically. This is the ground work of intellectual education. The farther a liberal education is pursued, the more does sensuality relax its hold. The exercise of lofty thought is incompatible with moral depravity. The cultivation of taste, is also favorable to purity of habit, since to a man of refined apprehensions vice is hideous because of its deformity. For this reason the fine arts should be fostered, and young people should be encouraged to study the beautiful.

The influence of music is especially elevating and refining. In short, the love of the beautiful is akin to the love of the good; and he whose mind is schooled to find gratification in the master pieces of sculpture, painting, music, poetry and the like, will not be likely to seek pleasure in sensual excitements.

The human mind is constituted so as to demand occasional amusement and recreation. All work and no play makes Jack not only a dull boy but an unhappy, and frequently a bad boy. If Jack is not supplied with legitimate fun, be sure he will find that which is not legitimate. The social nature must not be ignored. Men do not always go to the saloon solely for the stomach's sake; they go for the sake of conversation, sport, entertainment. They go to kill time. It therefore becomes the community in which the saloons are suppressed to substitute some other and better means of

recreation, such as a popular reading room, a course of good lectures, elegant and attractive amateur theatricals; or, perhaps better than any of these, a regular old fashioned lyceum with its stimulating debates. These public amusements, whatever they be, should be supplemented by, or rather should be the supplement of a well organized social system operating directly upon home life, and the genial association of neighbors and friends in private circles. Nothing is more charming than the courteous, kindly intercourse of polite and cultivated people. The conventionalities of good society, demanding as they do fine deportment and agreeable address, are, to the young, the best school of manners.

The refined and cultivated classes are disposed to live an exclusive and selfish life and forget what they owe to those who rank below them in the social and educational circle. The lower ranks as they are called, are the very ones that need attention. They demand more than good wishes; they want sympathy and countenance. The poor, the lowly, the miserable, the degraded, the ignorant,—these are the classes that are to be reached by the strong, kind hand of Reformation. Let there be a closer contact of rich and poor, high and low. The whole body of community must rise or sink together.

Especially let the children of the humbler classes be cared for. If the young are properly trained for one or two generations the temperance reform will be consummated. Men and women who have reached maturity without contracting injurious habits are not likely ever to become drunkards. *Begin right*, and persevere for the first twenty years of life in correct habits, and you are reasonably safe. There are certain periods in the development of youth that are specially critical. These periods will be anticipated by wise parents, and the dangers that beset them may be guarded against.

Intemperance is departure from obedience to the laws of correct living. Therefore, to prevent intemperance we must remove the causes which induce such departure. We must

establish such habits and confirm such principles as will inevitably secure obedience to the laws of right living; and secure a willing obedience. This I believe to be possible though not easy. It is a matter of education, taking the word in its fullest sense. Joubert says "Man might be so educated that all his prepossessions would be truths, and all his feelings virtues."

To the work, then, of thorough, fundamental, complete education of men's bodies, minds, and spirits, must we address ourselves if we would effectually prevent intemperance or any other special vice.

The contemplation of a task so difficult and tedious may dampen the ardor of the impatient; but nevertheless it is the task set for us. It will be good work if we accomplish it in a hundred years.

CINCINNATI, O.

WHAT we need most is not so much to realize the ideal, as to idealize the real.—*Hedge*.

TO HAVE ideas is to gather flowers. To think is to weave them into garlands.—*Madame Swatchine*.

EVERY branch should be taught as much as possible by illustrations. In fact many topics of almost every branch can not be successfully taught in any other way. Grammar needs illustration throughout. We are often compelled to use illustrations in Arithmetic in order to establish or explain its principles. Botany studied without the aid of pictures or real flowers would be darkness; Geology the same. Illustration is the foundation stone of Geography. All the rhetoric and oratory in the world could not give us as clear and definite an idea of a mountain as one silent painting.

CORRESPONDENCE.

CURIOSITIES OF ALGEBRA.

Editors Normal Teacher:

I desire to discuss the question proposed to its correspondents by the N. Y. Clipper—"Whether the score 1 to 0 in favor of the Chicagos against the St Louis Reds won. A's bet that the Chicagos would double but not quadruple the score of the Reds."

One number is said to be double another when the quotient obtained by dividing the former by the latter is 2.

So if one number divided by another gives a quotient or ratio 3, the former is said to be thrice the latter, and so on.

Now $1 \div 0 = \frac{1}{0}$; but $\frac{1}{0} = \text{infinity}$, because, according to a simple proposition in Algebra, where the numerator is constant, the fraction diminishes as the denominator is lessened. Hence when the denominator is reduced to Zero, the fraction is increased to infinity. Or, as we have said before, the quotient of, or ratio between, 1 and 0 is infinity. Therefore in no sense can it be said that 1 to 0 is the same as 2 to 1. Because the quotient of the first two is ∞ , and of the latter 2. Manifestly then 1 is more than double 0, more than thrice 0, more than quadruple 0.

Mr. A in one aspect of the case therefore *loses* his bet since the Chicagos *did* quadruple the score of the Reds. In another view of the case he *won* his bet, since one score was more than that of the other. For since 1 is exactly twice $\frac{1}{2}$, it must be at least more than double 0, which is less than $\frac{1}{2}$.

To prevent such dilemmas as the above, which can not be satisfactorily settled for both parties, the Editor suggests the determination of some arbitrary rule which shall serve for future guidance, be free from doubt and yet violate as little as possible the plain rules of Algebra.

To forward this desirable result to "gentlemen of the cloth," I wish to offer a few suggestions.

Take the fraction $\frac{a}{b}$. Now if m be added to both numerator and denominator, we obtain the fraction $\frac{a+m}{b+m}$, which it need hardly be said is not equal to $\frac{a}{b}$. For, dividing $b+m$ into $a+m$ we go through such an operation;

$$\begin{array}{r} b+m \overline{) a+m} \quad \frac{a}{b} + m - \frac{am}{b+m} \\ \underline{a + \frac{am}{b}} \\ m - \frac{am}{b} \end{array}$$

We may write this quotient in this way: $\frac{a}{b} + \frac{bm-am}{b^2+bm}$, by multiplying the second term or complex fraction above and below by (b).

Now then $\frac{a+m}{b+m} = \frac{a}{b} + \frac{bm-am}{b^2+bm}$; and $\frac{a+m}{b+m}$ is greater than $\frac{a}{b}$ by the quantity $\frac{bm-am}{b^2+bm}$. Again, as we reduce m, the quantity originally added to both numerator and denominator, this difference will grow less. For evidently if $m=0$ we get $\frac{a}{b} = \frac{a}{b}$, showing that the smaller we assume (m) to be, the

less is the error we commit by saying that $\frac{a}{b} = \frac{a+m}{b+m}$.

To illustrate, take the fraction $\frac{1}{2}$. Now if we add 1 to both terms, we change the fraction more than if we add $\frac{1}{1000}$. But as it would be inconvenient for practical purposes, as in the case of betting, to use fractions we are obliged to take 1 the smallest integer. Hence then when we say that $\frac{a}{b} = \frac{a+1}{b+1}$, we commit the least error possible for practical purposes.

Let us now apply our rule. In the case of a score 1 to 0 or $\frac{1}{2}$, we have according to the above rule $\frac{1}{2} = \frac{1+1}{0+1}$ or $\frac{1}{2}$ or 2:1.

Similarly in the case of a score 2 to 0, or $\frac{2}{3}$ we have by the rule $\frac{2}{3} = \frac{2+1}{0+1} = \frac{3}{1}$ or 3 to 2.

Again 3 to 0 is equivalent (with the least possible error for practical purposes) to $\frac{3}{4}$ or 4 to 1 and so on.

Now to decide Mr. A's bet by this rule. 1 to 0 is practically equivalent to 2 to 1. This being granted, 1 to 0 is plainly less than 3 to 0. That is to say less than its equivalent 4 to 1.

1 to 0, therefore being $= 2$ to 1 and < 4 to 1 Mr. A loses his bet.

The Clipper proposes the following rule,

"Make 1 to 0 equivalent to 2 to 1

2 to 0 " " 4 to 1

3 to 0 " " 6 to 1 &c.

Let us discuss the relative merits of these two rules in the light of the result to be attained thereby.

The above rule of the Clipper is apparently got by assuming

$\frac{a}{b} = \frac{2a}{b+m}$ (m) being always equal to unity.

For ex. $\frac{1}{2} = \frac{2 \times 1}{0+1} = \frac{2}{1}$;

$\frac{2}{3} = \frac{2 \times 2}{0+1} = \frac{4}{1}$;

$\frac{3}{4} = \frac{2 \times 3}{0+1} = \frac{6}{1}$, and so on.

But it is easy to show that $\frac{2a}{b+m}$ is greater than $\frac{a+m}{b+m}$; and conse-

quently the Clipper's rule involves a much greater error than ours. In both rules we assume $m=1$; but (a) in both can never be less than unity,

since $\frac{a}{b}$ is a proper fraction and consequently both numerator and denominator are integers.

Therefore $2a > a+m$ in every case save where $a=1$ or the score stands unity to zero. In every other case than the Clipper's error is greater.

For imagine the case where the runs made are 2 and 0.

According to the Clipper $\frac{a}{b} = \frac{2a}{a+m}$; or $\frac{2}{0} = \frac{4}{1}$; whereas by our rule $\frac{2}{0+m} = \frac{2}{1}$; Plainly therefore, in this particular, our rule is preferable; and we can further urge in its favor, that there appears none coming so near true principles, violating less algebraic rules and of such easy and general application.

I take pleasure in submitting the above as an instance of the many curious yet practical uses to which Algebra can be put, attesting its power as an instrument of scientific investigation. Very truly yours,

PAUL PELTIER.

ANALYSIS OF SENTENCES.

Editors Normal Teacher:

In your "queries and notes" on grammar, I find the following sentence which you wish analyzed, to wit: "The Spartan youth were accustomed to go barefoot." This is a simple declarative sentence. "Youth" is the subject, and "were accustomed to go barefoot," is the predicate, "were" is the verb or copula and "accustomed," "to go" and "barefoot" are the attributes. It has three attributes.

The subject "youth" is limited by "the" and "Spartan," both simple adj. elements of the first class, both define "youth," the latter also denotes country.

"The Spartan youth," is the complex or logical subject.

"Were accustomed," is a regular transitive verb, pas. voice, and form, ind. mode, past tense, 3d per. plu. number to agree with "youth." (Note 3 Rule 4 Greene). "To go" is an irregular intransitive verb, infinitive mode, present tense, and depends upon "youth," (Rule 15 Greene), and would be used abstractly, only that the sub. of subordinate clause being the same as that of principal clause, and being omitted in process of abridgment, the abridged predicate must refer to "youth," unless controlled by a superior term.

"Barefoot" is a qualifying adjective, not compared, and with "were accustomed to go," forms the predicate, (Rule 3 Greene), and like "to go" is part of the abridged predicate of the subordinate clause whose subject was the same as that of the principal clause; hence it must refer as predicate adjective, to the principal subject, and can not be used abstractly, nor can

the whole abridged predicate "to go barefoot," be controlled by a superior term in its present construction, for "were accustomed" is a pas. verb, and hence in this case copulative.

If not too lengthy, I hope you will publish this, as there are many persons here, including several teachers, interested in the analysis of this little sentence.

In Prof. Holbrook's parsing of "to rave," in the sentence, "Where distant Tweed is heard to rave," I differ from him, when he says, that "to rave" has the construction of an adverb of manner.

This cannot be true, since "to rave" does not show the manner of the action of the verb, "is heard" at all, but it denotes a condition of the subject "Tweed," hence it is used adjectively, and modifies the subject.

J. G. HURLEY, *Milton, Ill.*

NOTES AND QUERIES.

MATHEMATICS.

1. A man owed \$600, payable in 4 yr. 2 mon., he pays \$300 now; what sum should he pay at the expiration of the time? *MIGNONETTE.*

2. Two trees standing on a horizontal plane are 120 ft. apart. The height of one is 100 ft., the other 80 ft. Whereabouts in the plane must a person place himself so that his distance from the top of each tree, and the distance of the tops themselves shall all be equal to each other? *Id.*

3. The father's age is equal to the age of both of his sons and one year more; the elder son's age is equal to the cube root of the father's age multiplied by the square of the cube root of the younger son's age; the younger son's age is equal to the sum of twice the square root of the father's age and twice the square root of the elder son's age, minus one year. What is the age of each? *B. B. P., Danville, Ind.*

GRAMMAR.

1. Please diagram and parse italicized words in the following sentence: Now *blessings light* on him that first invented sleep; it covers a man *all over*, thoughts and all, *like* a cloak. *L. A. MARTIN, Connersville, Ind.*

2. Correct: "Often touching will soil silver." *JOSEPH WALL.*

3. One man meeting another says, "I have no *name* and I don't know yours; but how far is it to Macomb?"

[a] What is the antecedent of each of the pronouns?

[b] If it is the person himself, what is the difference between a noun and a pronoun? *J. L. S.*

4. Name some authors who agree with Butler in calling them nouns. *Id.*

5. Please parse italicized words in the following sentences:

- [a] He had no idea *but what* he was honest.
 [b] The Atlantic Ocean is *five* thousand miles *wide*.
 [c] He went *as far as* he could.
 [d] He ran *so fast that* he could not be caught.

ABRAM GROVE.

GEOGRAPHY.

1. In what countries does slavery still exist? J. WALL.
 2. Why has Rhode Island two capitals? *Id.*
 3. Which is longer, the Equator or a meridian circle? Why? *Id.*
 4. Which is greater, the Eastern Hemisphere or the Northern? Why? *Id.*

5. Our Geographies teach us that at the time of the Vernal and Autumnal Equinoxes the days and nights are of equal length all over the globe; they also teach us the days and nights at the poles are *always* each six months long Will some one please explain? J. A. S.

ANSWERS.

1. [Vol. III, No. 10, Q. 2, p. 379.]

A blank paper-book containing 48 sheets is sold for \$3.50, and another containing 78 sheets of the same size for \$4.75; the binding costs the same in both, and paper was of same quality. What was the price of the binding?

Let x = cost of binding.

Then $\frac{\$3.50 - x}{48} = \frac{\$4.75 - x}{78}$; clearing of fractions,

$\$273.00 - 78x = \$228.00 - 48x$; transposing,

$30x = \$45.00$; dividing by coefficient of x ,

$x = \$1.50$ cost of binding.

J. A. S., Leesville, O.

2. [Vol. III, No. 10, Q. 6, p. 380.]

Please tell me why the tropics of Cancer and Capricorn were placed where they are? Why were they not farther to the north or south?

The tropics are placed $23\frac{1}{2}^\circ$ from the Equator, the highest or farthest points from the Equator, where the sun's rays fall vertically or the northern limits of the Great Circle of Illumination. Were the earth's inclination from its perpendicular greater they would be farther north and south of the Equator. *Id.*

3. [Vol. III, No. 10, Q. 3, p. 380.]

Where was the "Great Eastern" built and what was its size?

The "Great Eastern" was built by J. Scott Russell, on the Thames, England. This ship is 680 ft. long, 83 ft. wide, 58 ft. deep, 28 ft. draught, and of 24000 tons measurement. T. A. PUGH.

4. [Vol. III, No. 10, Q. 4, p. 380.]

How can we prove that the diameter of the earth is about 8000 miles?

The form of the earth is that of a sphere flattened at the poles. Now, the diameter of a sphere is about $\frac{1}{2}$ times its circumference. Navigators

have sailed round the earth, and by actual measurement have found the circumference to be nearly 25000 miles. *Id.*

5. [Vol. III, No. 10, Q. 2, p. 380.]

Is Cuba still under the Government of Spain?

Yes.

6. [Vol. III, No. 9, Q. 2, p. 237.]

I desired *him* to go.

Him, pro. personal, ant. person spoken of, with which it agrees in number, masculine gender, 3rd person, objective case, subject of the infinitive to go.

I compelled *him* to go.

Him should be parsed as in the first sentence.

JENNIE BROWN.

7. [Vol. III, No. 9, Q. 1, p. 337.]

Diagram and parse italicized words:

"The *swan* on still St. Mary's lake,
Float double, swan and shadow."

S. D. {	Swan	The' on lake'	|	still' St. Mary's'
		[being]'		swan ⁴ and ^c shadow ⁴
	Floats | double			

First *swan* is a noun, com., fem., 3d per., sing., nom. case, subj. of float. Second *swan* is nom. case after the participle *being* understood; so is also the noun *shadow*.

Float should be *floats* to agree in person and number with its subject *swan*. M. A. GRUBER.

8. [Vol. III, No. 9, Q. 4, p. 337.]

Parse italicized words in the following:

I was amused *at* the way *that* he *laughed*.

It is incorrect. It should be, I was amused at the way in which he laughed.

At is a preposition showing the relation between way and was amused.

Which is a relative pron., antecedent way, obj. of *in*.

Laughed is a reg. intrans. verb., ind. past. 3rd per. sing. and agrees with its subj. he. *Id.*

9. [Vol. III, No. 6, Q. 1, p. 225.]

Why is the pendulum bob made flat?

The pendulum bob is made flat for two reasons: 1st. For convenience. 2nd. To prevent friction from the air, with which it would come in contact during vibrations. E. A.

NOTES.

How would you explain long division to beginners?

The method which has proved most successful with me is this: The class having thoroughly mastered short division, tell them that long di-

vision is just the same except that instead of subtracting the product of divisor and quotient figure mentally, we write it under the figures from which it is to be subtracted.

Then, instead of conceiving the remainder placed below the next figure of the dividend, we write that figure after the remainder for convenience in the next division. Then find how many times the divisor is contained in this number for the same reason as before.

This is my method. If any one has a better one I should like to hear it.

EVE J., *Mechanicsville, Iowa.*

GRAMMAR—ALSO READING EXERCISE.

I'll prove the word that I have made my theme,
Is that that may be doubled without blame:
And that that that thus trebled I may use,
And that that that that critics may abuse
May be correct. Further, the Dons to bother,
Five thats may closely follow one another!
For be it known that we may safely write
Or say, that that that that that man wrote was right:
Nay, e'en that that that that that that followed,
Through six repeats the grammar's rule has followed,
And that that that (that that that that began)
Repeated seven times is right! Deny it who can.

GEO. W. FRENCH, *Brooklyn, N. Y.*

GRAMMAR DEPARTMENT.

GRAMMAR.

BY A. HOLBROOK, PRINCIPAL OF NATIONAL NORMAL SCHOOL, LEBANON, O.

-
1. Though every comfort (1) *be withdrawn*
On this, my steadfast soul relies,
(2) *Father*, thy mercy never dies,
(3) *Fixed* on this ground will I remain,
Loved with an everlasting love.
 2. (4) *Peace*, doubting (5) *heart* my (6) *God's* I am;
(7) *Who* formed (8) *me* (9) *man* forbids my fear,
When (10) *passing* through the waters deep,
I ask in faith his (11) *promised* aid,
The waves an awful distance keep,
And shrink from my devoted head.
 3. God's holy law (12) *transgressed*

- Speaks nothing but (13) *despair*,
 (14) *Convinced* of guilt, with grief oppressed,
 We find no comfort there.
4. (15) *Lost* are they now and scattered wide,
 With no kind shepherd near (16) *to guide*.
5. How various his (17) *enjoyments* (18) *whom* the world
 Calls (19) *idle*!
 Delightful (20) *industry* enjoyed at home,
 And nature dressed to his taste
 Inviting him abroad—
 Can he want occupation who has these?
6. Wisdom is a pearl with most success
 (21) *Sought* in still water.
7. I made him (22) *known* to all my friends.
8. His becoming the leading (22) *witness* indicated
 No hostility to the (24) *accused*.
9. Nor children run (25) *to kiss* their sire's return,
 Or climb his knee the envied kiss (26) *to share*.
10. Heaven from all creatures hides the book of fate;
 (27) *All* but the page described; their present (28) *state*.
 From brutes (29) *what* men, from men what spirits know,
 Or who could suffer (30) *being* here below?

 PARSINGS.

REFERENCES ARE MADE TO HOLBROOK'S COMPLETE GRAMMAR.

- (1) '*Be withdrawn*,' Subjunctive, passive, present, agrees with its subject 'comfort,' in 3d, sing., R. 9.
- (2) '*Father*,' nom. absolute by direct address, R. 22.
- (3) '*Fixed*,' participle, passive, past. construction of an adjective and limits 'I,' R. 20 and 1.
- (4) '*Peace*,' nom., subject of 'be' understood, R. 15. Second reading. Peace [be to thee,] doubting heart, etc.
- (5) '*Heart*,' nom. absolute by direct address, R. 22.
- (6) '*God's*,' possessive in predicate with 'am' and limits its subject 'I,' R. 19.
- (7) '*Who*,' relative pron. antecedent, God's, R. 5., nom., subject of 'formed,' R. 15.
- (8) '*Me*,' objective, subject of 'to be' understood, R. 15.
- (9) '*Man*,' objective in predicate with 'to be' understood, referring to the same thing as its subject 'me,' R. 14.
- (10) '*Passing*,' participle, act., pres., construction of an adverb of time and limits 'ask,' R. 20 and 2.
- (11) '*Promised*,' adjective, descriptive, participial, limits 'aid,' R. 1.

- (12) '*Transgressed*,' participle, passive, past. construction of an adjective limiting, 'law,' R. 20 and 1.
- (13) '*Despair*,' objective, object of 'but,' R. 18.
- (14) '*Convinced*,' participle, passive, past, construction of an adverb of cause, limiting 'find,' R. 20 and 2.
- (15) '*Lost*,' adjective, descriptive, in the predicate, with 'are,' and limits its subject 'they,' R. 1.
- (16) '*To guide*,' infinitive, act., pres. construction of an adverb of purpose imitating 'near,' R. 20 and 2.
- (17) '*Enjoyments*,' nom., absolute by exclamation, R. 22.
- (18) '*Whom*,' objective, subject of 'to be' understood, R. 16.
- (19) '*Idle*,' adjective, descriptive, in predicate with 'to be' understood, limiting its subject '*whom*,' R. 1.
- (20) '*Industry*,' noun without case or construction; as the sentence is left incomplete, by the author.
- (21) '*Sought*,' participle, passive, past., with construction of an adjective, limiting 'pearl,' R. 20 and 1.
- (22) '*Known*,' infinitive, passive, present, with construction of a noun, the object of 'made,' R. 20 and 17. The sign *to* is omitted by R. 21., and the auxiliary *be* is suppressed by Art 917.
- (23) '*Witness*,' nom., in predicate with 'becoming,' referring, to the same thing as its possessive subject, 'his,' Art. 1100.
- (24) '*Accused*,' adjective, descriptive, participial, limiting 'person' understood, R. 1.
- (25) '*To list*,' infinitive, act., pres., with construction of an an adverb of purpose, limiting 'runs,' R. 20 and 1.
- (26) '*To share*,' infinitive, act., pres., with construction of an adverb of purpose, limiting 'climb,' R. 20 and 2.
10. Second reading. Heaven hides from all creatures the book of fate; all [the pages] but the *page* described; their present *state*. [Heaven hides] from brutes the *pages which* men [know], etc.
- (27) '*All*,' adjective, pronominal, limits 'pages,' understood, R. 1.
- (28) '*State*,' objective, in apposition with 'page,' R. 13.
- (29) '*Pages*,' antecedent part of 'what,' objective, object of 'hides' understood, R. 17.
- (29) '*Which*,' relative part of 'what' is the object of 'know' understood, R. 17.
- (30) '*Being*,' participle, active present, construction of a noun, object of 'suffer,' R. 20 and 17.

TRUTH can not long be concealed; she will burst the doors of her imprisonment and flash her splendors on the world.—*Bulwer*.

DEPARTMENT OF THEORY AND PRACTICE.

BY F. P. ADAMS, PRINCIPAL CENTRAL NORMAL COLLEGE, DANVILLE, IND.

MY TRAINING CLASS.

THE VERB.

Teacher. Mr. Pierce, how would you introduce the verb to a class?

Mr. Pierce: I would follow very much the same plan agreed upon concerning the noun. I would first make them familiar with verbs by numerous illustrations and examples. They will then be ready for the name verb, and possibly for a definition.

Miss Josie, I would like to know why he would do all that before giving the definition.

Teacher. Can some of those who agree with Mr. Pierce assign a reason for so doing?

Miss Jessie. I believe this plan awakens thought, causes the pupil to observe, and arouses an interest in recitation. I believe, moreover, that this is the order of Nature, whose laws are very instructive. I may say further that this plan is sanctioned by Pestalozzi, one of whose great principles is that we should develop the idea before giving the term.

Teacher. I think Miss Josie, you will agree, on reflection, that Miss Jessie's answer is correct and very suggestive of some great truths.

Miss Alice. May I ask what is the correct definition of a verb?

Teacher. Inasmuch as the method of teaching the verb will not differ materially from that employed in teaching the noun as given before, I have thought it well to devote the remainder of this hour to the discussion of the definitions of the terms used in connection with the verb. I will first ask you, Mr. McKee, what a definition is.

Mr. McKee: I learned in one of the other classes recently that a definition of a word is such a description of it as includes all that belongs to it and excludes all that does not belong to it.

Teacher. That will answer very well for practical purposes. As the origin of the word signifies, a definition of a word is its boundary or limit. Now, ladies and gentlemen, you have as much right to make definitions as any one; but let me caution you to use care before giving them to the public. It is difficult, and of some things impossible, to give logical definitions.

Many of the definitions commonly quoted could, I think, be easily improved.

For example, a certain author says "*A relative pronoun* is one which stands for a noun and connects sentences." You will see that the definition of a pronoun is included in this, whereas we ask only for the marks which distinguish a *relative* pronoun.

"A relative pronoun is one" &c., means that is *one pronoun* &c. Then is it necessary to add the definition, "which stands for a noun?"

What is the mark which distinguishes a relative? Another grammarian says: "A relative pronoun is one which may stand for any grammatical person, and connects clauses." So may an interrogative stand for any grammatical person.

Now, I think the following definition is correct; "A relative pronoun is one which joins to its antecedent a limiting clause." Every relative does this; no other kind does. I merely refer to the definition of a relative for illustration.

Mr. Graves what is a verb?

Mr. Graves: A verb is a word which signifies action, being or state.

Mr. Haynes. I object to that definition I think there are some *nouns* that signify succession, revenge &c.

Teacher: The objection is sustained and the definition, though the common one, is incorrect. Who else will try?

Miss Cora: I find this definition in one of the books; A verb is a word which asserts action, being or state.

Teacher: That is evidently a better definition than the other. However, are there any criticisms on it?

Miss Laura: Does an infinitive assert any thing?

Teacher. Evidently not; neither does the participle. Yet they are both verbs, having subjects, objects, voice, mood, tense and form.

Miss Emma. Holbrook says they *assume* action, being or state.

Teacher: Yes, and while it is not very satisfactory to include all infinitives and participles under the idea of *assuming*, and excluding all nouns from the same class, it is nevertheless the best I know of. Then how shall we construct the definition, Mr. Nowlin?

Mr. Nowlin: A verb is a word that asserts or assumes action, being or state.

Teacher. That is Mr. Holbrook's definition and is probably as satisfactory as any we can give.

Mr. Bray, what is a regular verb?

Mr. Bray: One which adds *d* or *ed* to the present.

Miss Carrie: I think it always adds *ed*.

Mr. B: *Love* is a regular verb, but does not add *ed*; it merely adds *d*. So my definition, I think, is right.

Carrie: I claim that *Love* adds *ed* but first drops the final *e* according to the rule. When you add *ing* it drops the *e*, and does it for the same reason when you add *ed*. While I am up, I would like to ask if *hear* is regular or irregular?

Mr. Jones: According to the definition first given it is regular, because it adds *d* to the present for the past indicative and perfect participle. But even the grammarians who give this definition give *hear* in the list of irregular verbs.

Teacher: *Hear* is undoubtedly an irregular verb and the definition as first given is wrong.

Mr. Jay: I have a definition I like better than any I have heard. It is this: A regular verb is one whose past indicative and perfect participle *end in ed*.

Teacher: Has any one any objection to Mr. Jay's definition.

Mr. Rich: I don't believe it will work. The verb *led* ends in *ed*, but is irregular. So does *fed*.

Teacher: Well, to sum up the discussion what is a regular verb?

Miss Sucece: A regular verb is one which adds *ed* to the present to form the past indicative and perfect participle.

Teacher: The definition is correct.

Remark. Time forbids a continuation of this article. But every property of the verb should be dealt with in a searching and independent manner.

To commit and "parrot off" the definitions of others is time worse than wasted. To investigate, to decide, to point out errors, to carry a proposition to logical conclusions, to analyze these are positive advantages.

READING REFORM.—AMONG THE AUTHORS.

BY R. HEBER HOLBROOK, ASSOCIATE PRINCIPAL NATIONAL NORMAL SCHOOL.

[I have received over one hundred postals from persons in all parts of the United States who report that they have purchased Webster's Unabridged and McGuffey's Revised Sixth Reader.]—R. H. H.

Scholars, there is a great deal being said now days about language lessons, memory gems, choice selections, &c. Now if this reader is what it ought to be it is full of the best words of the best writers in the English language, and I maintain that we need form no other class nor purchase any other book than just what we have in order to accomplish the best kind of language drill and to enjoy the interest of our literature.

First, though, who can tell where in this work to look for a list of the authors represented in it?

To the Index? No, there is no Index in the book. Oh, to the Contents. Yes. But what is the difference between an Index and a Contents? Not quite. The Contents is an arrangement of the subjects treated in the work in the order in which they occur in the text, and is generally in front of the book; while an Index is an alphabetical arrangement of the contents of the book, and is generally placed in the rear of the book. Both are indispensable and no book is worth publishing that isn't worth having an Index. This book ought to have one. Its absence is a great defect. In purchasing books it is always well to notice whether they have an Index to recommend them.

If you wish to determine what is in a book, look to the contents, if you would know where anything is in a book, use the Index. It will pay to train yourselves and your pupils to the use of an Index.

But to my first question. Where shall I find the names of the authors quoted in this reader? Yes, you will find them on pages V-VIII, where each authors name is given after the title of each lesson, but there is a more convenient list beginning on the IX page. It is alphabetically arranged and so we do find an Index of authors, but not an Index of subjects. In this list are some points for drill which the Contents does not furnish us. Please turn to it.

Now, look down the first column and pick out all the authors whom you think are American. There are five you should know at a glance. They are Beecher, Bryant, Calhoun, Cary, Emerson and Franklin.

Now in the next column there are again five that you should know at once: Halleck, Holmes, Lowell, Irving, Longfellow. Of course there are other American authors in these columns, but these you should be able to recognize at a glance.

Now on the next page there are five American names which should be "household words." Make your own list and compare it with this: Prentice, Prescott, Sumner, Webster, Whittier.

The other important ones are English writers, of course, but we will not now stop to recognize them.

Now tell me how you can judge of the popularity of these authors from this list. It would be best for us to take the one first whom "not to know would be not to be known" the most emphatically. And if we can safely determine who it is we will read something from him first, no matter where in the book it is found. How should we know who he is?

By the selections from him, you say. Not quite. We can't tell what the selections are. Oh, the number of selections. That is right. The most popular author will have the largest number of selections from his work in the book. Which one is it, remember the fifteen Americans we noticed?

Yes, Longfellow, from whom there are four. Who next? Yes, Bryant, Irving, and Webster, each have three. Good, who next? Beecher, Holmes, and Whittier, each two. Here then is a good list—Longfellow, Bryant, Irving, Webster, Beecher, Holmes, and Whittier.

But which of these are the poets and which the prose writers? Yes, Longfellow, Bryant, Whittier, and Holmes, the latter being also a prose writer; while Irving, Webster, and Beecher are prose writers.

We have learned something then. If you were called upon to mention the three leading poets of America, you could say Longfellow, Bryant and Whittier. The leading prose writer, you could say Irving, and your answers would be satisfactory.

Let us now talk about the parties. Are they living or dead, if living, how old are they? Where can you determine this?

True, in your Webster, in the "Pronouncing Biographical Dictionary," p. 4705. This is the great excellence of the Revised Unabridged over the older editions. Here, while the ladies are examining their dictionaries can the gentlemen tell where else we can obtain the same facts?

Right at the head of the first selection from any author is given a biographical sketch, this will prove much more satisfactory than the Webster.

We find that Bryant is dead, Longfellow and Whittier are still living, and both seventy-three years of age, while Bryant died at the ripe age of eighty-four. The advanced years given to these men is a fitting testimony to the temperateness, purity, and sweetness of their lives. When we remember how many literary characters are not only brilliant but bad, we have reason to rejoice as teachers, that we can point our pupils to any of our leading American poets with certainty that we shall not be compelled to apologize for their morals while we praise their writings.

We have spent enough time on this. For your next lesson you may prepare a list of the fifteen names of American authors, writing their whole name, their age, or date of birth. Out of this list you may prepare to state from memory three facts of Longfellow, Bryant and Whittier. Besides this I wish you would read over the four selections from Longfellow and be ready to choose which one you would prefer to study as a special lesson.

EDITORIAL NOTES.

CONDUCTED BY R. H. HOLBROOK, ASSOCIATE PRINCIPAL NATIONAL NORMAL SCHOOL, LEBANON, OHIO.

The Central School Journal, published at Keokuk, Ia., is bright and fresh, well edited as to selections, editorials and news.

Hours of Recreation is a paper for everybody, published monthly at Chicago, by T. S. Denison. It contains some of the most original and best colloquies for schools and home use that we find anywhere.

Epes Sargent, well known as the author of Sargent's Readers died during Holiday week at his home, Roxbury, Mass. He was connected with several Boston papers, and is the compiler of many different works.

The contemptible, unAmerican caste rule at West Point will find its doom in the management of General O. O. Howard, whom the President has appointed to succeed Gen. Schofield. Everyone is pleased with the change. Gen. Howard is not only a soldier, but a gentleman and a Christian, and a scholar.

Ireland's present condition is a good argument for Dodge, Adams, White & Co., against public education. The real source of the trouble there is the natural educational system which has taught the Irish to strive intelligently for what they have so many years struggled for in ignorance.

The Board of Directors of the Cincinnati University invite themselves and their friends to a champagne supper at the University's expense and strange to say "at a very late hour the party broke up, most of those present wishing similar entertainments were given by the Board of Directors oftener than once a year." The Cincinnati University is outspoken on temperance and religion.

We are beginning to weary of hearing leading educators brag on the graded schools of the county and mourn over the "backward" condition of the country district schools. We are ready to maintain that there is *better* work done in our country schools than in any other schools of the same grade in the country. They may not work up as big "per cents" but they work up men and women. We know whereof we affirm.

Now that Prof. Harris is back from his European trip, refreshed and rested, we wish he would let the refinements of metaphysics alone and settle to the work of formulating in a brief, clear and practical treatise the laws of education. He has already written more and thought deeper in these matters than any school man in the country, with perhaps one exception. Prof. Bain and his ilk have given educational problems a wrench toward materialism which Prof. Harris breathing Concord air, could straighten out with a blow.

Teachers' Reading Circles are beginning to be the vogue. We see that county Superintendent Davis, of Clarion County, Pa., and Supt. F. M. Westhafer, of Martin Co., Ind., and Supt. G. W. Fitch, of Fayette Co., Iowa, as well as many others, have organized such bodies and have prescribed certain portions for three months study in G. Dallas Lind's "Methods of Teaching in Country Schools," so that the whole work shall be read in that time. The idea is a most excellent one and we take pleasure in calling the attention of other school officers to it.

Professor Alphonso Wood, the Author of Wood's Botany, so well and favorably known through his works and his teaching in the West, died at West Farms, near New York City, Tuesday, January 4, in his seventy-first year. He was born at Chesterfield, N. H., graduated at Dartmouth, studied for the ministry, but began teaching at Meridian, N. H., where he became interested in Botany. He taught also in Cleveland, then at College Hill, where he was long connected with the Ohio Female College. A most touching tribute is paid to his memory by the Cincinnati Daily Gazette, by one who had evidently learned to respect and love him as his pupil.

THE SENATE EDUCATIONAL BILL:

The following is the substance of Mr. Burnside's Educational bill as it recently passed the United States Senate:

The net proceeds of sales of public lands and of patents are forever set apart for the education of the people. The Secretary of the treasury shall yearly apportion to the several States and Territories and the District of Columbia, upon the basis of population between the ages of five and twenty years, the said net profits for the previous year, which shall be credited on the books of the Treasury as an educational fund, on which four per cent. interest per annum is to be paid to the States as above; providd that for the first ten years the apportionment shall be made according to the numbers of the population of ten years old and upward who cannot read and write; and provided, further, that one-third of the income from said fund shall be annually appropriated to the completed endowment and support of colleges established or which may be established under the act of 1862, until the amount annually thus accruing to said colleges in each State shall reach \$30,000, after which the whole income of said fund shall be appropriated to the said States, Territories and District to the education of all children between the ages of six and sixteen. The Secretary of the Treasury is authorized to add to the fund any sums given to the United States for that purpose. A sum not exceeding fifty per cent. of the amount received by any State, etc., the first year, and not exceeding ten per cent. in any year thereafter, may be applied, at discretion, to the maintenance of schools for the instruction of teachers of common schools. To be entitled to the benefits of this act any State, etc., must maintain for at least three months in each year until January 1, 1885, and thereafter four months in each year, a system of free public schools for all children between six and sixteen years of age. Any State, etc., misapplying any of the money received under this act shall forfeit further grants until the amount so misapplied shall have been replaced by said State, etc. Nothing contained in the act shall be held to alter any previous law regarding the disposition of public land nor to limit the power of Congress over the public domain, nor to interfere with the granting bounty land to soldiers and sailors. The bill also authorizes colleges established under the act of 1862 to establish schools for the technical education of women.

"Then stay at home, my heart, and rest
 The bird is safest in its nest;
 O'er all that flutter their wings and fly
 A hawk is hovering in the sky;
 To stay at home is best."

—Longfellow.

COLLEGE DEPARTMENT.

**DEVOTED TO THE INTERESTS OF THE CENTRAL NORMAL,
DANVILLE, INDIANA.**

Dear Friends: Before this reaches you the spring term will be fully under way. The Fall and Winter terms have been the most prosperous of any in the history of the Institution. The prospects for the Spring and Summer terms are gratifying indeed. We expect a large attendance and are fully prepared to meet all demands that may be made. The wants of Normalites are various but we think we can supply all reasonable demands. Some will come to get the peculiar benefit of Prof. G. Walter Dale's instruction in elocution, others to profit by the drill in music and voice culture by Prof. Hopkins, many to learn the simple and cheap methods of illustrating the sciences by apparatus which they will be taught to manufacture for themselves under the instruction of Dr. Tingley, others for the general practical instruction in the common branches, higher mathematics &c.

We would have you remember and tell your friends that there are but few institutions where pupils perform the experiments in Natural Science and construct much of their own apparatus and that the Central Normal is the *ONLY* institution which has a manufacturing department where the more costly and complicated pieces of apparatus can be made by the students at the simple cost of material which is but a trifle compared with the prices such apparatus generally sells for.

Are you a teacher or superintendent of a graded school where you are obliged to teach Philosophy, Chemistry and the Higher Mathematics and the school boards have failed to furnish you with sufficient apparatus to illustrate them? Then you should come here and not only learn the best methods of teaching these branches but be able to take home with you apparatus with which you can illustrate almost any principle in science. Are you a teacher of a country school and do you wish to be up with the times by being able to give interesting morning talks with experiments that will awaken thought, create an interest in school and prevent tardiness? Then you should come here, take a course in the Natural Sciences and go home equipped with the ideas and apparatus for such work.

The educational world is moving, you will be left in the rear if you do not stir yourself, and wake up to the demands of the present.

But enough of lecturing. Let us see what news from our old friends.

You have not all heard yet that our last year's secretary and now principal of the Patoka, Ind., schools J. P. Wright, was married sometime during the Holidays, to Miss Nora Barnett, of Danville. You did "Wright"

Miss Nora, though you are Miss Nora, no more, you are "Wright" nevertheless. May you both see many happy anniversaries.

J. S. Schoff and E. M. Palmer are taking their second "dose" of medical lectures at the Ohio Medical College, Cincinnati. They will soon be full fledged M. D's. and successful ones they will be for they have had Normal training such as will best fit a person for any station in life.

W. F. McMahan writes from Brighthurst, Ind. He is teaching but fears he will be obliged to quit on account of ill health. W. H. Watson is teaching at Valley City, Ind. He says, "I am enjoying reasonably good health, I have plenty of hard work to do. My enrollment is 67 and still they come." J. R. Shreck, Waco, Neb., who was here in 1879 thinks he will be back again soon. Nelia Wringfield writes from Ellettsville, Ind. She says, "The Reunion of Normalites on paper is interesting to me. I find my work in the Normal last Spring and Summer to be of inestimable value to me in my teaching this winter, I hope to be with you again in the Spring." Clara E. Hill writes from Nashville, Tenn., "I can work for the Normal with so much pleasure for I am sure every one who could attend would be pleased because of the earnestness and good work together with so much kind feeling from teachers and students. I have never known any one who has attended the Normal who was not highly pleased with it."

A very interesting letter from Ada B. Mills, Greensboro, Ind. Wish we could give it entire. Have space for a short extract: "I attended our county Institute. J. U. Hinshaw, Harvey Lucas, Miss. Hart and L. R. Ginn and a few other Normalites were there but we were all thinking more about the Normal methods than of all the *fine theories* of some of those Professors who know little or nothing of the 'breakers ahead' for the district school teachers and after sitting for 5 days under the 'Scientific dripping' we returned to study out our own plans. I secured a good district school for the term of 4 months and Friday evening completed the first half. I am well satisfied. I have learned the lesson "*Adaptation to Circumstances*. I found all grades, sizes and ages, had my programme previously prepared and organized in 10 minutes."

C. F. Allen, W. O. Smith, J. W. Nichols, C. F. Hamilton, J. W. Fertig, Laomer West, J. C. Stone, and Harry Nowlan, paid the Normal a visit during the holidays. J. U. Hinshaw is teaching at Mechanicsburg, Ind Tom W. Smith is teaching at Curran, Ill. Florence Puett, Booneville, Ind., writes, "every day do I think of the pleasant time I spent with you in the Normal and I hope to be there again in the Spring." Her brother J. S. Puett is now in the Normal. W. C. Crawford is teaching at Bean Blossom, Ind., says he finds a use for his Normal instruction and will be back next summer.

It is not enough that the child knows his lesson. His form of reciting it should receive attention.

NATIONAL NORMAL DEPARTMENT.

DEVOTED TO THE INTERESTS OF THE NATIONAL NORMAL SCHOOL, LEBANON, WARREN CO., O.

When pupils come into a school they meet their teachers for the first time with a good deal of interest. Their tuition is paid, they are full members and entitled to all the privileges the institution can afford. They earnestly desire to do the best for themselves and look to their teacher for that wisdom and experience, and interest, and enthusiasm that will awaken in them their highest motives, and call out their best energies.

How surely the teacher is measured, not the first day, nor the first week, but after a few weeks have past, the novelty worn off, and the time for steady, regular, pull comes—then does he prove himself.

You know how easy it is to sham enthusiasm, to create a factitious performance of energy. But this is soon punctured. Nothing but the genuine lasts. Nothing but the honest endures. Nothing but the sincere succeeds.

How many teachers teach for themselves, not for their pupils. They care more for the good will of the few leading pupils than for all the interests of the many who work slowly but surely. They do all the work for their pupils, explaining, explaining, explaining, while the pupils sit by, pleased perhaps at first that everything is made so plain, but at last discovering that they have become weaker and weaker until school is a burden and their original fire and energy cooled down for want of activity. Such a teacher is popular at first, and with the strangers, but those who have learned that their own improvement is mainly in their own activity, soon see through the shallow performance and will at last choose the teacher who expects work of them.

A pupil was overheard to say, "I like Mr. ——— as a teacher he expects original genuine work, not too much, but enough. And when we fail is not too lazy, or indifferent or too afraid of his popularity to tell us so, and to help us to find out the way to put in good strokes. Why I have been at schools where the teachers did not seem to care whether we had our lessons or not. If we didn't solve the examples they would solve them for us. That kind of teaching nearly ruined me. I am glad I am where work is the word. I am getting stronger every day, have more confidence in myself. I am really acquiring a good power of work."

Power of work! That is it? Not power of listening, not power of receiving, not power of passive soaking in, but power of active, original, interested, intense, well directed industry.

With what anxiety does the conscientious teacher watch his class as to this point. How often he asks himself, Am I doing too much of their

work? Am I discouraging them by expecting too much. Have I not faith enough in their powers and their spirit to give them grand things to do? Am I demanding unreasonable and impossible things? Am I forgetting that they are strong and will do nobly if I but give them a chance?

Classes differ very much. Some are full of pluck and difficulties arouse them, others are really weak and anything hard undoes them at sight. To reduce a plucky class to weakness and indifference is easy. Let the teacher always take out of their hands the difficult work and he will soon see them sink—into admiration for his wisdom? Yes, and in a firm belief in their own utter incapacity. Such work is not unfrequently done. It requires often time much nerve and self denial on the part of the teacher to forego the easy pleasure of displaying his own knowledge by reciting the whole lesson himself, and wait for the hesitating, yet, reasonable effort of the pupil to do his duty in trying to recite.

But sensible pupils will not be long thus abused. They seek the teacher, who taking a really weak and timid class by skilful management, vigorous drill, crisp encouragement and sharp exhortation awakens them to a real zealous confidence in their own ability, till they at last attack with snap and success difficulties which at first would have appalled and demoralized them.

What a pleasure to be with such teachers! How one can overlook their personal peculiarities and love them for the work's sake.

It is in this spirit and toward these ends that we strive in the Old Normal, friends. It seems as if a new power for good and success were upon us. Our faculty is more unified than ever. Our interests are more one and more with the school—with the pupil. As a result we are doing clearer cleaner, clinchinger work than ever before.

Our material prosperity will soon receive a new impulse by the completion of a rail-road from Cincinnati through Lebanon to Dayton. While you are reading this, the trains are running regularly between Lebanon and Cincinnati.

We cordially invite young ladies and gentlemen who are thinking of attending a school to send for a catalogue. Remember when you read it, and read others that our catalogue and so our school is the original source of most of the good and original things which you find in many others. This is in no spirit of disparagement of them, but simple truth and justice to ourselves. Many of our young friends are doing honest, splendid work, in which we take pride, not only because their success testifies to our work, but because they are worthy and good and are blessing mankind. We have hundreds in attendance who will go out, just as they have, to further the work, and new ones are joining us, each one feeling and saying: "If the National Normal has done so much for these it can do as much and more for me."

This is our earnest, sincere, prayerful purpose friends. Come and try us.

For catalogue and particulars, address,

A. HOLBROOK,
Principal National Normal School, Lebanon, O.

PUBLISHER'S DEPARTMENT.

—Read all the advertisements.

—Agents wanted to sell our books. No better books; no better inducements offered by any house.

—If you want to make money take an agency for our books.

—The Examination Department does not appear in this No., owing to the fact that no questions were prepared and sent out by State Board, for December. The questions and answers will appear next month, as usual.

—This No. closes Vol. III of *THE NORMAL TEACHER*. Our success during the past year has been beyond all precedent in the history of school journalism. *THE NORMAL TEACHER* just three years old has the largest circulation of any school journal in this country. This is the most deserving compliment that could be paid it by an appreciative public. Many school journals have much to say about teachers not appreciating and patronizing educational magazines. *THE NORMAL TEACHER* has had no reason to complain of want of patronage from the day the first No. was issued, March, 1878. To our many thousand readers and friends in every State and Territory of the Union, as well as in other countries who have contributed to our success, we return our most sincere thanks. We solicit a continuation of your patronage and good will for Vol. IV, and shall promise our best efforts to make the new volume the best of all.

CONVERSATION CIRCLE.—Prof. Dale proposes to organize a "Conversation Circle" in connection with his work at the Central Normal during the spring and summer terms. The work done will be practical, involving the study of the principles of conversation, enriched by abundant practice and general reading.

The lovers of good conversation are asked to make a note of this, and come into the Circle, where they may reap the benefits arising from the instruction of the finest modern writer upon the subject.

The course of instruction is being laid out very carefully, and the advantages to be gained in general and aesthetic culture are almost incredible. A course of conversations extending over a term of sixty days will be given at an admission fee of \$20.

This will admit to all the exercises of the Circle during the season of sixty conversations. The date of opening will be announced in the February number of the Teacher.

For information, address
(Care of J. E. Sherrill,)

GEORGE WALTER DALE,
Danville, Indiana.

Your Last Chance!

This is your last opportunity to secure a copy of Prof. Dale's Outline of Elocution for \$1.00. This offer closes March 1st. *Do not forget it.* ORDER NOW.

—Send in your name and One Dollar and secure a copy of Prof. G. Walter Dale's *Outline of Elocution*. Reasons why you should do so:

1. Because it is the best book on the subject in the English language.
2. Because it is the finest self-instructor ever prepared upon the subject.
3. Because the selections are the choicest in the whole realm of Elocutionary Literature.
4. Because it is the most philosophical analysis and concise and explicit exposition of Elocution to be found in print.
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6. Because it contains twelve appended essays that are not to be found even in substance in any one nor in all the books on Elocution now extant.
7. Because it will save you fifty cents to order in advance of issue if you accompany the order with the cash (\$1.00).
8. Because the subject of Elocution is becoming more popular and you want standard works.
9. Because this is a standard work.
10. Because after the date of issue you can not obtain a single copy for less than \$1.50.

BOOK TABLE.

CONDUCTED BY G. DALLAS LIND.

WORDS AND NUMBERS. A Lesson Book for Primary Schools. By Henry E. Sawyer, A. M. Associate Prin. State Normal School, New Britain, Conn. Boston: Thompson Brown & Co. Thos. H. Bush, 70 Metropolitan Block, Chicago, Ill., Western Agt.

This little work was originally prepared for the use of the primary schools under the author's supervision and was used in them in manuscript. We quote from the author's preface which briefly explains the contents. "It is designed for the second year in the primary school and

with the exception of a reader is the only book they will need that year. On each page the work for one week is prescribed. This consists of 1. A motto or sentiment to be learned and recited. This serves also as the copy for writing lessons through the week. 2. Four short spelling lessons. 3. Tables in addition, subtraction, multiplication, or division. 4. A large number of carefully graded examples for slate-work. 5. Four topics for oral lessons on behavior; morals, hygiene, plants, animals, points of the compass, place, geography, measures, or natural phenomena." This is followed by a few pages of hints &c., to teachers. We can easily imagine a live teacher making good use of this book in the school room. Too many primary teachers are not just the right persons in the right places. This book suggests a natural method of instruction and will have a tendency to elevate the grade of work done in primary departments. Price for introduction 18 cts.

PRACTICAL LESSONS IN ENGLISH, Made Brief by the Omission of Nonessentials. By J. M. B. Sill, A. M. Supt. of Public Schools, Detroit, Mich. A. S. Barnes & Co.: New York and Chicago.

In this book the author has been true to the title. The lessons are practical and contain only the important part of what is generally contained in text books on grammar. The aim has been to present the subject in such a manner that grammar will appear a delightful and important study and not a dry mass of technical matter. The comparatively few essentials of the subject are copiously illustrated by examples for practice. The author truly says, "Words are lifeless things until they are put into relations with other words." Therefore he begins the subject with a discussion of the sentence. It is a compact and neat volume of 202 pp. in excellent typography on tinted paper.

APPLETON'S AMERICAN STANDARD GEOGRAPHIES, Based on the Principles of the Science of Education and Giving Special Prominence to the Industrial, Commercial, and Practical Features. Elementary Geography. D. Appleton & Co.: New York, Boston and Chicago.

A school Geography fully up to the requirements of the times. The subject is treated objectively, being presented in a simple manner which leads the pupil to definitions. Instead of beginning with a general description of the earth the pupil is introduced to a knowledge of direction and distance and the geography of the school room and school grounds, from there to individual countries and thus up to the earth as a whole. The topic method is skilfully combined with the question and answer system. The illustrations are new and fine and the general appearance of the book is superior to that of ordinary school books.

EXHIBITION DAYS, Containing Dialogues Recitations, Charades, Tableaux, Original Blackboard Exercises, Pantomimes, and Plays. For Grammar and High Schools, and Parish and Parlor Entertainments. By Mary B. C. Slade, Editor of "Good Times" and author of "Children's Hour," "Holiday Concert" etc. Boston: Henry A. Young & Co.

This little book will help fill an important place. The selections are generally good and well adapted for the purpose.

THE CHILDREN'S HOUR, Containing Dialogues, Speeches, Motion Songs, Tableaux, Charades, Blackboard Exercises, Juvenile Comedies, and Other Entertainments. For Primary Schools, Kindergartens, and Juvenile Home Entertainments, By Mrs. Mary B. C. Slade. Boston: Henry A. Young & Co.

We can say the same of this book that we said of *Exhibition Days*.

THE ART OF SECURING ATTENTION, By Joshua G. Fitch, M. A. Syracuse N. Y., Davis, Bardeen & Co. Price 15 cents.

This is No. 4 of the *School Room Classics* and is the substance of a lecture delivered to training classes established in connection with the British Sunday School Union.

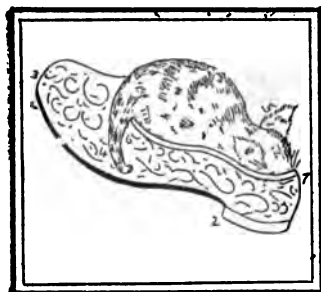
BOOKS AND PAMPHLETS RECEIVED.

Song Bells! A Music Book for Public Schools and Juvenile Singing Classes. To which is Prefixed a Complete and Attractive Course of Elementary Instructions and a Great Variety of One, Two, Three, and Four Part Songs, By L. O. Emerson, Author of "Golden Wreath," "Merry Chimes" &c. Boston: Oliver Ditson & Co., New York: C. H. Ditson & Co., Philadelphia: J. E. Ditson & Co., Chicago: Lyon & Heady.

The Morning Light! A Choice Collection of New and Old Songs for Sunday Schools, Prayer Meetings, Conference Meetings and the Home Circle, By S. W. Straub, Author of "Golden Rule," "Good Cheer" &c. Chicago: Root & Sons, Music Co. Sample copy 35 cts., \$30 per hundred.

Carleton's Language-Culture No. 1. Word Practice, a Graded Outline for Spelling, Pronouncing and Using Words, with Ruled Blanks for the Practice, By W. J. Carleton, Principal German-English School, Indianapolis.

Manual of the French Verb, Showing its Complete Formation. Designed to accompany Every French Course, By Ellen Freeman. Cincinnati: Robert Clarke & Co. Price 25 cts.



Inventive Free Hand Drawings.—Three Sheets.—30 Drawings on a Sheet,—90 in all, mailed for 15 cents, or \$.70 per doz.

Blackboard Beauties. Just published. New and elegant. Figures indicate the BEGINNING and ORDER of the LINES, hence any teacher can make them.

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WEBB'S MODEL WORD-BOOK SERIES, comprising: I. The Model Definer, Price 40 cents. II. The Model Etymology, price 65 cents; III. A Manual of Etymology, price \$1.00.

HART'S ELEMENTARY GRAMMAR.—Teachers will be pleased with this little book. It is a plain, practical and progressive introduction to the study of English Grammar; written by a teacher who in a life-long experience in the school-room studied profoundly the methods of approaching the young mind. Price 40 cents.

GROESBECK'S PRACTICAL BOOK-KEEPING—SCHOOL EDITION.—The School Edition of Groesbeck's Practical Book-Keeping, it is believed, is better adapted to the wants of classes commencing the study than any other book in the market. It is plain, practical and progressive and well-arranged for use in schools. It contains both Single and Double Entry, and can be taught by any teacher with but very little study, even if he has not already mastered the science of book-keeping.

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A text-book that will gladden the hearts of both teachers and pupils. With it the subject can be mastered in less time than with any other book on the subject. Price \$1.50.

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MANUALS FOR TEACHERS.—No. 1. The Cultivation of the Senses, 50 cents; No. 2. The Cultivation of the Memory, 50 cents; No. 3. On the Use of Words, 50 cents. No. 4. On Discipline, 50 cents; No. 5. On Class Teaching 50 cents.

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Many are bringing the entire expense, including fuel, light, and personal washing within the sum, \$2.50.

The SPRING TERM begins Jan. 19, 1881, commencing advanced and review classes in all the common branches are sustained; also in most of the higher, including higher arithmetic, algebra, Geometry, book-keeping, surveying, engineering, rhetoric, history; also in penmanship, elocution, drawing, and vocal music.

Students can enter at any time, and select their own classes, paying from time of entrance.

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offered in this institution for the rapid and thorough mastery of every subject make it, by far, the cheapest school or college in existence.

These advantages consist, in part, of the peculiar methods of instruction and training invented and practiced here; in the fact, that all our teachers are graduates of this institution and selected from the best of those trained here, each one for his or her special fitness for the position occupied; also in the free use of an extensive library and apparatus.

So popular are these methods, invented and pursued here, that more than a dozen of our graduates are carrying on paying institutions of their own, using the same methods so far as they are able. Still, the original source of these peculiar and effective methods of training and drill is ever in advance by new improvements, and by employing teachers trained especially in and for this work, here.

THE UNEQUALED SUCCESS OF OUR STUDENTS,

both graduates and non-graduates, in all the professions, as well as in teaching and business, gives assurance to those who come here of like success.

In most cases, an attendance of one or two sessions here enables the teacher to secure a better position, with increased wages, enough so to reimburse him or her speedily for the outlay.

Our students come in competition, everywhere, with the graduates of colleges and of other Normal Schools, who have spent more than

Double the Amount of Time

and money in their education; and yet those trained here more frequently secure the best positions and retain them with increased salaries.

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which is sent free to all applicants, gives full information on all desirable topics pertaining to the school.

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I received the highest award given to any one at the Centennial Exposition of 1876, and the only award and medal given to any American for "Collections of Minerals."

My Mineralogical Catalogue of 100 pages is sent post-paid on receipt of 25 cents, heavy paper, 50 cents, bound in cloth 75 cents, half sheep \$1.25, half calf \$1.25, cloth interleaved \$1.00, sheep interleaved \$1.25, calf interleaved \$1.50; (price list alone, 16 pp. 3 cents). It is profusely illustrated, and the printer and engraver charged me about \$1100 before a copy was struck off. By means of the table of species and accompanying tables most species may be verified. The price list is an excellent check list, containing the names of all the species and the more common varieties, arranged alphabetically and preceded by the specie number. The species number indicates the place of any mineral in the table of species, after it will be found the species name, composition, streak or luster, cleavage or fracture, hardness, specific gravity, fusibility and crystallization. I have very many species not on the price list, and some that I had in 1876 are no longer in stock.

COLLECTIONS OF MINERALS

For Students, Amateurs, Professors, Physicians, and Other Professional Men.

The collections of 100 illustrate all the principal species and all the grand subdivisions in Dana and other works on Mineralogy; all the principal Ores, &c., &c. The collections are labelled with printed label that can only be removed by soaking. The labels of the \$5.00 and higher priced collections give Dana's species number, the name, locality, and in most cases, the composition of the Mineral. Also accompanied by my illustrated Catalogue and table of species. The sizes given are average; some smaller, many larger.

NUMBER OF SPECIMENS.	25 in box	50 in box	100 in box	100	200	300
Crystals and fragments,	\$ 50	\$1 00	\$2 00	\$1 00	\$2 00	\$3 00
Student's size, larger,	1 50	3 00	6 00	5 00	10 00	25 00
Amateur's size, 2½ in. x 1½,				10 00	25 00	50 00
High School or Academy size, 2¼ x 3¼ in.,				25 00	50 00	100 00
shelf specimens				50 00	100 00	100 00
College size, 3¼ x 6 in., shelf specimens,				50 00	100 00	100 00

I have now over forty tons, and over \$50,000 worth of Minerals, mostly crystallized, in stock. It is well recognized that my prices are lower and my specimens better labelled than those of any other dealer in the country. This is mainly due to the immense stock I carry (the largest in minerals of any in the country) and my system of printed labels attached to the specimens.

Shells, &c.—I can put up collections of shells at the following low rates: 25 Genera, 25 species, \$1.00; in box, \$1.25, 50 Genera, 100 species, \$5.00; in box, \$6.00, 100 Genera, 300 species, \$25.00; 200 Genera, 1,000 species, \$150.00; 250 Genera, 2,000 species, \$500.00. See Nov. List of beautiful collections of Minerals, Shells, Eggs, &c., in solid black walnut boxes for presents.

Catalogue of 2,500 species of Shells, made for me by Gen. W. Tryon, Jr., who has labelled nearly all my shells, 3 cents, printed on heavy paper with genus label list 10 cts. I have purchased one of the most celebrated collections known, and have now over 2,000 lbs., 3,000 species, and 30,000 specimens of Shells and Corals in stock. Catalogue of Birds, Eggs, Eyes, Skins, &c., &c., 3 cts. Catalogues of Books, 16 pp., ea. 3 cts. Medicine, &c., 48 pp., 5 cts. (Please specify exactly what class of books you wish.)

As the correct naming of the specimens will be the important point to most persons, I feel justified in mentioning that I have been a collector of Minerals for sixteen years; that I was a student under Prof. Wolcott Gibbs at Cambridge, and Prof. A. Hofman at Berlin. I was also Instructor at Michigan University, and Professor in the Iowa S. A. College in Chemistry and Mineralogy for six years.

Send for the *Naturalist's Leisure Hour*, giving full particulars. Specimen copy free. You will confer a double favor by handing this to some physician, or other person interested in science.

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-IN-

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It is not a mass of "glittering generalities," but suggestions in detail as to how to teach and manage an ungraded school, drawn from long experience and observations of one who has been there himself.

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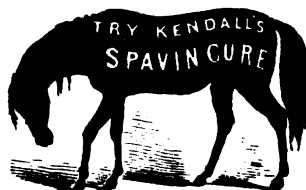
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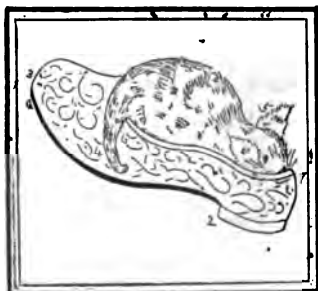
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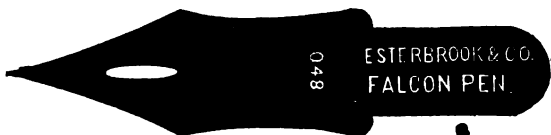
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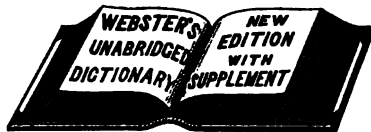
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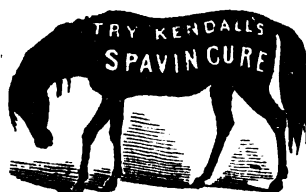
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Dr. B. J. Kendall & Co., Gents:—In reply to your letter I will say that my experience with Kendall's Spavin Cure has been very satisfactory indeed. Three or four years ago I procured a bottle of your agent, and with it, cured a horse of lameness caused by spavin. Last season my horse became very lame and I turned him out for a few weeks when he became better, but when I put him on the road he grew worse, when I discovered that a ring-bone was forming, I procured a bottle of Kendall's Spavin Cure and with less than a bottle cured him so that he is not lame, neither can the bunch be found. Respectfully yours, P. N. GRANGER.

Office U. S. Marshall, Western Dist. of Michigan, KALAMAZOO, April 15th, 1878.

B. J. Kendall, Enosburgh Falls, Vt.—Dear Sir:—I received the two bottles of your Kendall's Spavin Cure forwarded by express in January last. I am happy to state that it performed all your advertisement called for. In three weeks after I commenced using it the spavin was entirely removed and a valuable horse restored to usefulness. Very truly yours JOHN PARKER.

Statement made under oath:

TO WHOM IT MAY CONCERN:—In the year 1875 I treated with Kendall's Spavin Cure, a bone spavin of several months' growth, nearly half as large as a hen's egg, and completely stopped the lameness and removed the enlargement. I have worked the horse ever since very hard, and he has never been lame, nor could I ever see any difference in the size of the hock joints since I treated him with Kendall's Spavin Cure. K. A. GAINES.

Enosburgh Falls, Vt., Feb. 25, 1879.—Sworn and subscribed to before me this 25th day of Feb., A. D., 1879. JOHN G. JENNE, Justice of the Peace.

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NATIONAL NORMAL NOTES.

One hundred and eleven Scientifics are enrolled this year.

Secretary Sherman was at chapel exercises last week. He made a good non-political speech to the school. Mr. Sherman is far from being the cold blooded man he is so frequently represented to be.

Prof. J. B. Peaslee, Superintendent of the public schools of Cincinnati, delivered a free lecture recently at the Opera House and another at Chapel on his method of introducing the study of literature into the public schools. A hearty vote of thanks was given him for his very interesting addresses.

The Putnams, of New York will shortly issue a very finely illustrated edition of Prof. Venable's popular poem, "The Teacher's Dream." Price \$2.50. J. Holbrook & Co., agents, Lebanon, O.

Reunion No. 18, 101st session, is out. The contents are as follows:

National Normal, Announcement 26th year,

Editor's Address,

Letter Reunion,

Whereabouts of a few Normalites,

Births, Marriages, Obituary,

Our Quarter Centennial Celebration,

Commencement—Graduates,

Notes,

Twenty-sixth Year—Opening,

Correspondence,

Grammar.

It can be had free by addressing Principal Holbrook, Lebanon, O.

The Normal Lecture Course recently established, will be supplied as follows:

Olive Logan,

Dr. I. I. Hays, Arctic Explorer,

Dr. J. Jay Willars,

Anna Dickinson,

Helen Potter's Pleiades, and possibly

Henry Ward Beecher.

A. HOLBROOK, Principal,
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3. The use of written lessons gives great life and interest to the recitation through the comparisons, criticisms, &c.

4. By having the exercises corrected each day where mistakes have been made, the pupil has his work preserved to him in permanent form, for future reference.

5. Good teachers do not pretend to teach parsing, analysis, &c., in any other way than by the use of written lessons, to avoid waste of time, secure promptness and certainty of preparation. And all will prefer the Parsing Book from the fact that it is sold far cheaper than the blank paper can be bought at book stores. When these points are taken into consideration all must favor the immediate adoption of the book. Retail price, 20c per copy.

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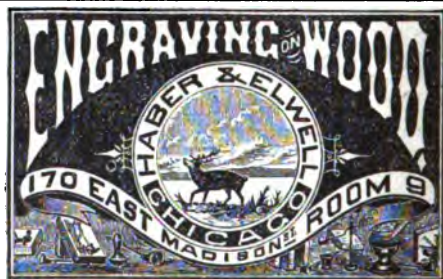
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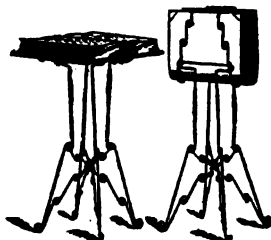
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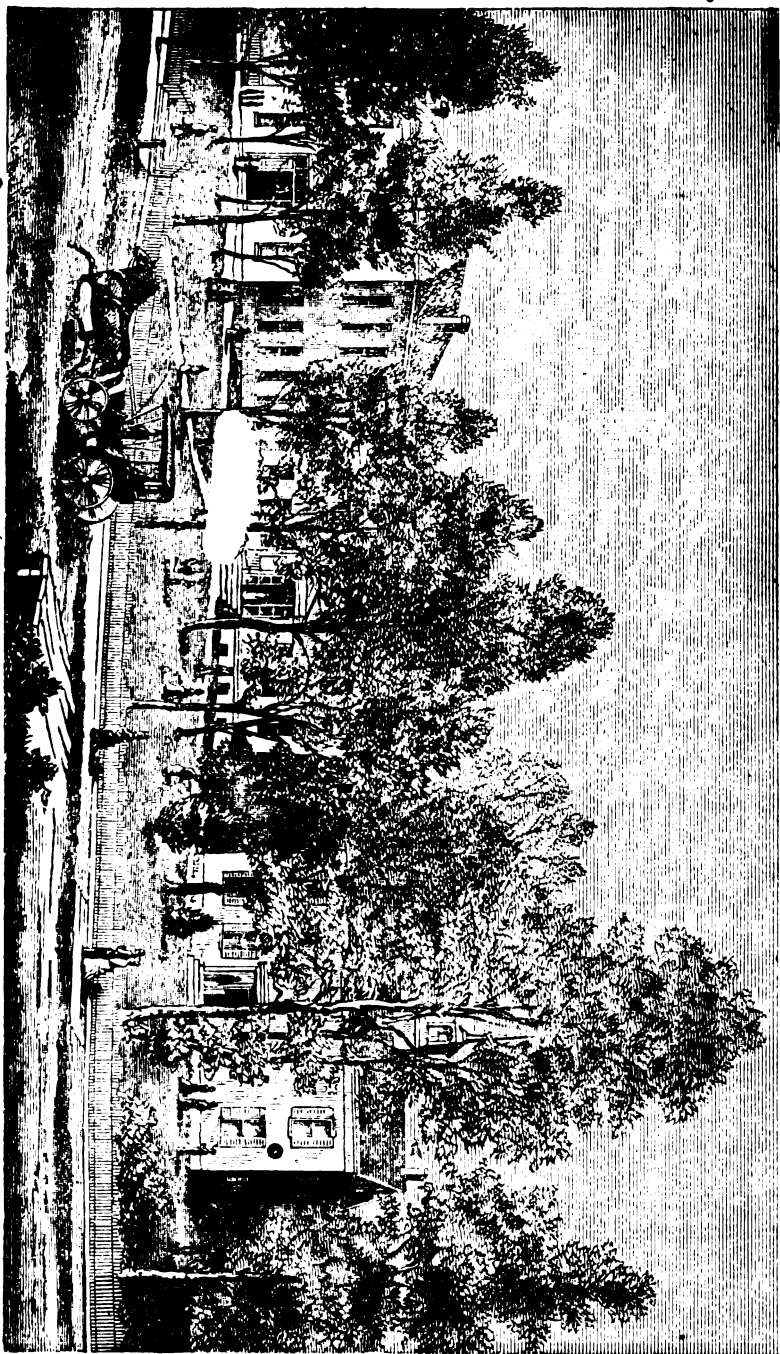
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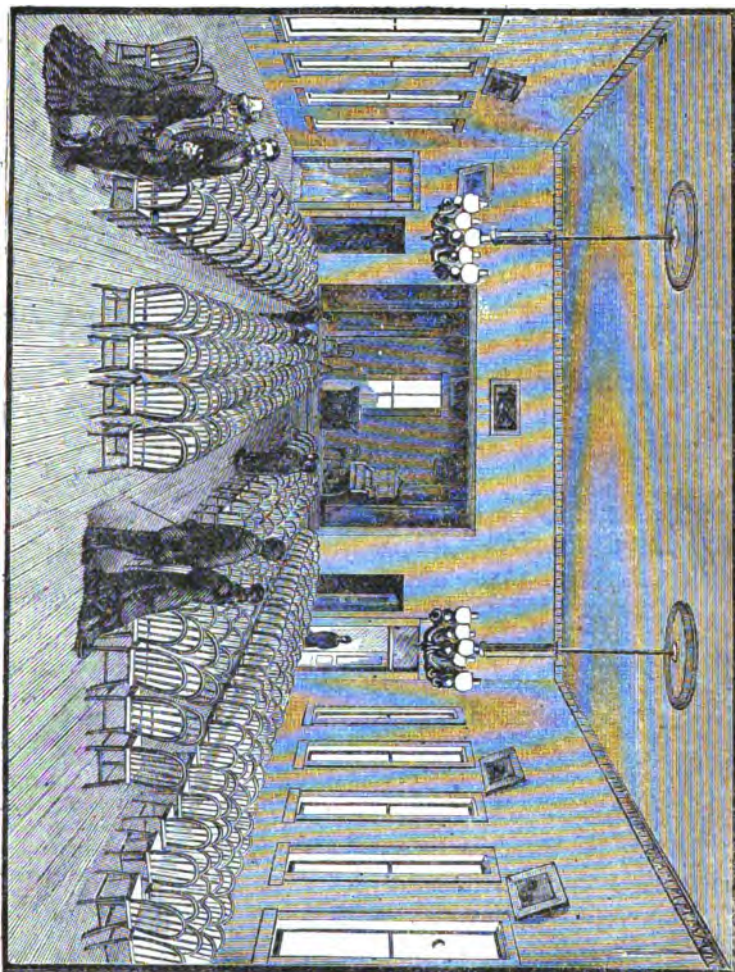
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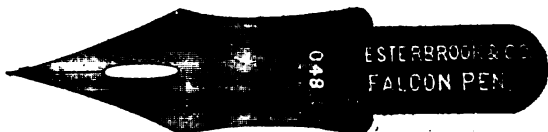
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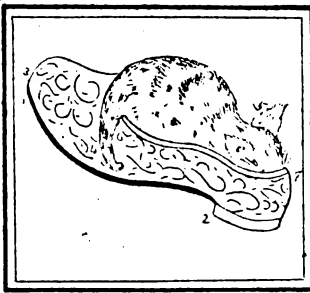
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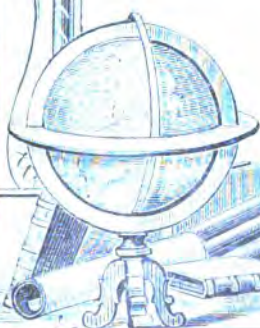
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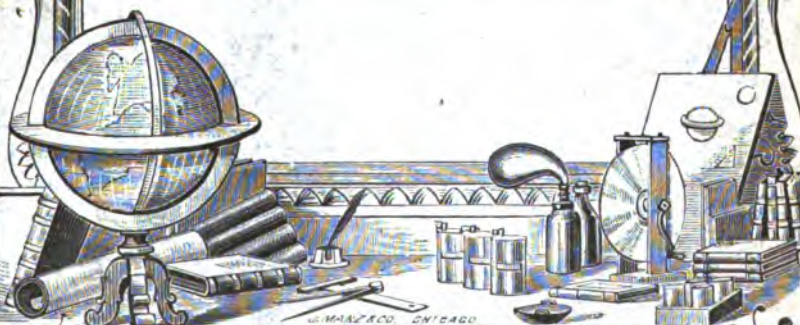
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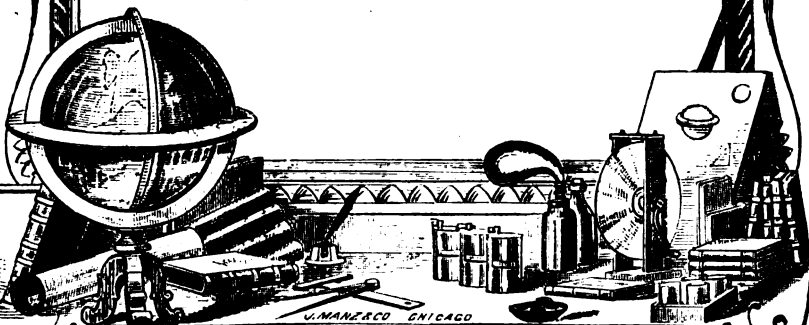
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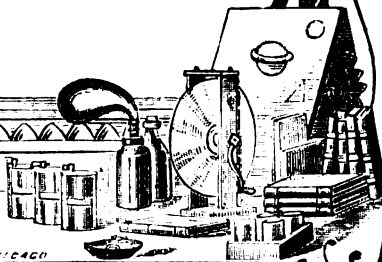
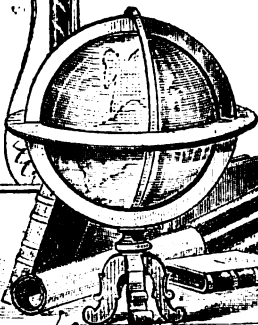
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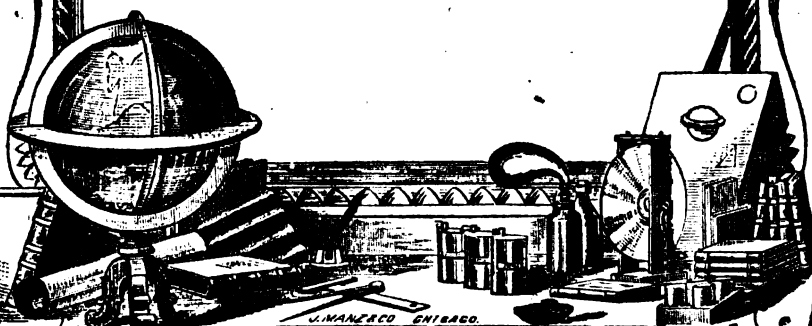
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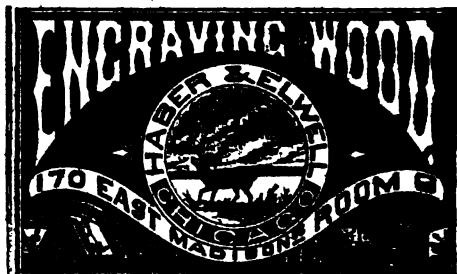
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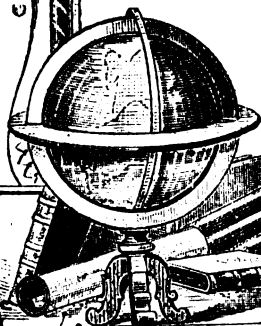
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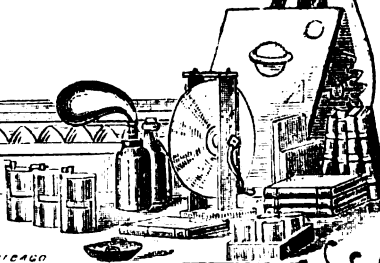
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VOL. III.

JANUARY, 1881.

No. 11.

THE

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